

Responses to Environment Canada

Comments on the Draft Red River Valley Water Supply Project Needs and Options Report



International Affairs Branch
10 Wellington Street
Gatineau, Quebec
K1A 0H3

29 SEP. 2005

September 29, 2005

J. Signe Snortland, Environmental Specialist
Dakotas Area Office, Bureau of Reclamation
P.O. Box 1017
Bismarck, North Dakota 58502

Dear Ms. Snortland:

Re: Government of Canada Comments on the Draft Report on Red River Valley Water Supply Needs and Options

Thank you for providing us with a copy of the above draft report for review and comment. Environment Canada is providing these comments with the benefit of input and advice from other Federal departments and the Department of Water Stewardship in Manitoba.

In reviewing this report, our main concern relates to how any particular option, if selected, could impact any transboundary waters or rivers that cross from the United States into Canada or affect boundary waters as defined by the *Boundary Waters Treaty*. Consequently, we have attempted to focus on those aspects of the analysis and associated assumptions that might influence which option is selected as well as how the characteristics of any particular option might impact the Red River or Lake of the Woods.

We are particularly concerned, as outlined below, by the assumptions underlying water demand, certain hydrological calculations, approaches to engineering design and costing, as well as the need for compliance with Article IV of the *Boundary Waters Treaty* which prohibits pollution to boundary waters and waters flowing across the international boundary to the injury of health or property on the other. Given Canada's long-standing concerns about interbasin diversions and the transfer of invasive species, the Government of Canada would request a reference to the International Joint Commission if our concerns are not addressed. We also look forward to discussing this matter further in upcoming meetings among senior Canadian and U.S. officials on transboundary water issues.

The fact that four of the seven options identified to deal with potential future shortages involve transfer of water from the Missouri basin to the Hudson Bay, Red River system is of great concern to us. The Hudson Bay and Missouri River watersheds have been separated for some 10,000 years. During this time, each



Responses to Environment Canada

Response to Comment 1

Your comment is noted. Please see responses to specific comments below.

system has developed unique flora and fauna. Connecting the two basins threatens a transfer of non-native species into the Hudson Bay system which is something that could have an irreversible adverse impact on existing aquatic systems and on commercial and recreational fishing in Manitoba. A commitment to finding in-basin solutions provides the best method for protecting ecosystems. While our comments on the Draft Report cover many aspects of the project, they should always be considered in the context of the potential effects of any proposed project on Canadian waters.

Water Demand

Population Forecasts

A key component of this study is the use of population forecasts which ultimately form the basis for estimates of future water use. We note that the two forecasts by the Bureau of Reclamation and Northwest forecast growth in population in the Red River Valley of 43% and 28% respectively. The estimates by individual municipalities are about 17% larger than the estimates by the Bureau. We understand that the estimates provided by individual municipalities were used for Scenario 2 while the Bureau's estimates were used for Scenario 1.

To try and establish the relevance of these forecasts, we reviewed two U.S. sources of population forecasts. The U.S. Census Bureau, on its web site, provides its own population forecasts to the year 2030. These show a projected decrease in North Dakota's overall population by 5% and a total increase in Minnesota of only 28% with most of that likely to occur in the metropolitan area centered in Minneapolis St. Paul.

We also examined a study by the private Population Reference Bureau which was released in 2005, which forecasts the entire U.S. population to grow by 28% by the year 2050. Although we appreciate the difficulties with forecasting so far into the future, the population forecasts used in the Draft Report are not supportable. We note in particular that for the forecasts used by the Bureau, the growth rate for Fargo and West Fargo in the last ten years of the forecast period (2040-2050) is higher than in the previous two decades; a 20% growth rate in the final decade as compared to 16% in the previous two. The same is generally true for the other municipalities. Considering that the reliability of a forecast tends to decrease the further into the future we look, it seems particularly unjustifiable to use increased rates of growths later in the planning period.

We also note that a strong determinant of municipal growth historically has been the result of rural migration to the urban centres. However, in both of the scenarios despite unprecedented municipal growth, the rural population remains relatively stable.

Typically, water supply planning studies attempt to show a range of possible outcomes based on a range of assumptions using alternative scenarios of growth in water use. The Draft Report approach is incomplete in that it includes a

Responses to Environment Canada

Response to Comment 2

The population projections conducted by Reclamation and Northwest Economic Associates were based on the cohort component method, which is generally regarded as the most comprehensive and reliable method to estimate population change over time. Thus, Reclamation believes that these population projections are the most realistic estimates available.

Reclamation revised the *Report on Red River Valley Water Supply Project Needs and Options, Current and Future Population of the Red River Valley Region 2000 through 2050, Final Report* to provide additional clarification on population projections and identified where populations would reside in the future. Reclamation did use the “optimistic” population projection of 417,600 (table 9) in the 13 eastern counties in North Dakota, but this was only 15,100 more than the results with migration shown in table 8 or a 3.8% increase. The difference was 27,079 or 6.9% higher than the projections provided by Northwest Economics Associates.

Two water demand scenarios used in the Report provide adequate data to understand the relationship between alternative costs and water demands. Additional water demand sensitivity analyses may be done for the FEIS (Final Environmental Impact Statement).

“best estimate” case (USBR estimates) and a “desired future” case (municipal estimates which would be the ultimate “high” estimate) but excludes an important third scenario that would address more realistic growth projections. Since all the scenarios are based on assumptions, it would be critical to show the sensitivity of the results to a range of possible scenarios for future growth. The third scenario could lead to considerably different approaches where deficiencies in supplies might be seem to be able to be dealt with through a combination of conservation, drought contingency planning and in-basin supply alternatives.

Water Demands and Conservation

The water demands used in the modeling have three basic components: per capita water use, population growth and assumptions for water conservation. In all three of these areas in the Draft Report we would suggest there is a strong bias to overestimation by using very conservative assumptions; combining them leads to an unrealistically high water demand.

Per capita water demands are based on maximum monthly water demands from several years. The combination of all of the monthly maximums in one continuous year as a representative demand is unrealistic because those historic demands appear to have been generated in a situation of adequate supply with no consideration of the need for conservation or drought contingency demand management.

The modeled demands are also based on conservative assumptions for conservation measures achieving between 6 and 8% of mean annual demand reductions. This assumption also seems very conservative when looking to the future where most jurisdictions see conservation as the first most realistic alternative to deal with growing population. It does not appear that the major centres in the Red River basin have implemented much in the way of conservation measures in the past 15 years based on their annual use so there would appear to be significant room for improvement. There are numerous case studies where conservation measures have implemented reductions in the order of 15 to 30% of the annual use in both the eastern and western U. S.. Given that the implementation of any of the options will likely bring about increased water rates, per capita demand will likely decrease due to the price elasticity of water.

The report should address why more use cannot be made of conservation measures or why success in such efforts is apparently not achievable in the Red River Valley service area given that most jurisdictions see conservation as the most realistic alternative to dealing with increased population growth and its associated increase in water demand. It should also define the current state of conservation by identifying the amount of metering across the basin and current use of, or requirements for, such things as water saving appliances.

It should also be noted that for each scenario, the assumptions related to conservation were attributed a cost. However, most jurisdictions are pursuing conservation because of the potential for cost savings and because of imposed regulations. Net savings can

Responses to Environment Canada

Response to Comment 3

Reclamation projections, plus an intermediate level of industrial demand, were used to develop the scenario one water demands. The scenario two demands reflect population estimates provided by the municipalities, plus additional growth in industrial water demand.

Maximum monthly demands were used in hydrologic modeling because these best represent water use during a 1930's drought. This is explained on pages 2-14 through 2-18 in the Needs and Options Report.

Current water demands in the Red River Valley are not considered high in relation to other areas in the Great Plains. Considerable demand reduction through water conservation has already been achieved in the Red River Valley. The additional water conservation savings estimated in the Needs and Options Report are reasonable and sustainable. Implementation of water conservation measures results in both costs and savings. The net effect is reflected in the cost estimates presented in the Needs and Options Report.

be achieved by delaying the need for expansion of water and waste water facilities. There appears to be no consideration of this opportunity.

The Draft Report appears to lack any assumptions regarding implementation of conservation measures for industrial use both for the continuance of existing use and new use. Industry is generally making large improvements in conservation through recycling, etc., as a cost-saving measure. We note that currently the majority of the industrial use is in the Grand Forks area but most of the new industrial use for 2050 appears to be located in the Fargo area (some 60%) when it is known that natural water supplies are much lower at Fargo than around Grand Forks.

Water Demand Scenario

In consideration of the above comments, we believe it would be useful to develop a more realistic scenario of lower population growth more consistent with nationally recognized population forecasts, as well as increased use of water conservation measures in keeping with many case studies across the U.S.A., and water demands more in keeping with average annual use. Such a scenario would very likely point to the ability to deal with a future drought using in-basin alternatives.

Hydrology

As has been stated within the Draft Report, the justification for the need for additional water supply sources is based entirely on the need to have unfettered supplies to meet demands during a 1930s type of drought. The supporting report by Meridian Environmental Technologies is focused on building a case for the likely recurrence of a 1930s type drought by the year 2050 notwithstanding the fact that the drought could have a frequency of occurrence of 1 in 100 years. We would note that statistically, there is no more likelihood of a drought of that magnitude occurring in the next 50 years regardless of whether a drought has occurred in recent times or not. The probability of an annual 1% event occurring within the next 50 years is, in fact, about 40% whereas the report infers that the probability is closer to 100%. The report should attempt to incorporate some probabilities, based on historical flows, on what the future probability is for a 1930s drought to occur within the next 10 years, 20 years and 45 years.

Typically, the least cost approach to dealing with a situation that has a relatively rare frequency of occurrence is to use one time emergency measures which usually involves revocation of the status quo. For the period of record used, some 71 years, water demands are essentially met 85% of the time. It is only during the 1930s drought, which amounts to 15% of the period, that significant shortages in water supply occur. It would seem reasonable then that during such an unusual event a different approach would be used where there would be water rationing and special conservation measures.

A drought contingency plan should be part of any strategy to deal with the prospect of a 1930s type drought. This would reduce the level of demand and lead to some acceptance by the public of water shortages. Such assumptions would change the

Responses to Environment Canada

Response to Comment 4

The two water demand scenarios used in the Needs and Options Report provide adequate data to understand the relationship between option costs and water demands. Additional water demand sensitivity analyses may be presented in the FEIS (Final Environmental Impact Statement).

Response to Comment 5

Although it is not possible to accurately predict when future droughts will occur, previous research has shown that droughts tend to be cyclical rather than strictly random events. Thus, as stated in the Meridian Technology, Inc. report (*Red River Valley Climate Study on Drought Frequency Investigations of the Red River of the North Basin*), "...the lack of a drought of the intensity of the 1930's drought suggests that there is a greater likelihood of such an extreme drought with time. Recent research indicates a strong probability of an extreme drought event occurring before 2050 AD".

Based on precipitation deficits across climate zones in the Red River basin, recurrence intervals ranging from less than 25 years to greater than 100 years were computed for the 1930's drought by Meridian Environmental Technology, Inc. Based on historic streamflow, Williams-Sether et. al. (1994) computed recurrence intervals for the 1930's to early 1940's drought from 25 to 74 years for streams in North Dakota¹. Designing a water supply Project to address hydrologic conditions of a historically recorded drought such as the 1930's is a reasonable assumption even though there are limits to scientific estimates for the recurrence interval of a 1930's drought. Additional analysis of the 1930s hydrologic drought recurrence will be presented in the FEIS.

Response to Comment 6

Reclamation conducted an evaluation of potential drought contingency measures. The results are summarized in chapter 4, pages 4-36 through 4-41 in the Final Needs and Options Report. An explanation of the complete analysis is included in Appendix C, Attachment 9 of the Needs and Option Report. The analysis shows that imposing drought contingency measures that result in water savings up to 7.5% has minimal economic impact, but water demand reductions above 7.5% result in negative economic impacts that outweigh potential cost savings.

¹ Williams-Sether, Tara; Macek-Rowland, K.M.; Emerson, D.G., 1994, Climatic and hydrologic aspects of the 1988-92 drought and the effect on people and resources of North Dakota: North Dakota State Water Commission Water Resources Investigation 29, 57 p. -- URL <http://nd.water.usgs.gov/pubs/wri/wri29/index.html>.

current demand and would serve to reduce the amount of water required. This would reduce the overall costs and likely make the in-basin alternatives more attractive.

The benefits of the alternatives accrue only if a 1930s type drought actually occurs. It appears that even with the assumption of maximum demands being met during a 1930s drought, only the cities of Fargo and West Fargo would experience significant water supply problems. The ability to confine the majority of the problem to one locale further strengthens the idea that special drought contingency planning should be considered.

Engineering Design and Costing

We note that the costs were developed in a standardized manner allowing for cost comparisons among options. However, in each case all the capital costs were assumed to be incurred up front in a one-time manner. Each option affords some opportunity to phase in particular features as water demand increases. In particular, the in-basin alternatives that develop use of ground water would be able to add features as the demand grows. Gradually phased development would lower the present value costs and the associated annualized costs. Such adjustments would make the in-basin alternatives more cost effective. For example, if 15% of the capital costs for the in-basin alternative could be delayed 15 years, which would seem entirely reasonable in a 45 year planning cycle, the present value would be about \$44 million less. This amounts to the current difference between the capital construction cost for the least cost Missouri basin transfer option and the in-basin option.

The potential to phase construction costs over time needs to be built into the cost estimates for all the alternatives, in particular the in-basin alternatives, to do a proper cost comparison.

Alternatives

We note that the GDU (Garrison Diversion Unit) import to the Sheyenne River is shown as the least costly alternative. Should cost form the basis for selection of the preferred alternative we would be concerned about the validity of the cost comparisons in light of our comments above and the need to properly consider phasing in the various features in pace with increasing demand.

Also as previously stated, an alternative that incorporates more conservation in keeping with trends in the United States and more consideration for drought contingency measures in managing demand would be a more realistic alternative. It would also be one that would be more consistent with being able to use in-basin features in time of a severe drought.

The Lake of the Woods option makes use of "boundary water" as defined under the Boundary Waters Treaty and therefore would require an Order of Approval from the International Joint Commission (IJC) and would be subject to its review and evaluation. Canada and Manitoba would want a comprehensive environmental

Responses to Environment Canada

Response to Comment 7

Each of the options described in the Needs and Options Report includes many component features. Some of the features are amenable to phased construction, while others are not. Discussion of phasing alternatives is included in chapter four, pages 4-35 through 4-36 in the Final Needs and Option Report.

Response to Comment 8

Cost is one of many factors that will be considered in selection of the preferred alternative.

Response to Comment 9

Reclamation believes that the water conservation incorporated into all options is reasonable and attainable. The potential for decreasing demands through the use of drought contingency measures is discussed in chapter four, pages 4-36 through 4-41 in the Final Needs and Option Report.

Response to Comment 10

If the Lake of the Woods Alternative is identified as the preferred alternative, Reclamation will seek an Order of Approval from the International Joint Commission. Potential impacts associated with this alternative are disclosed in the draft environmental impact statement.

assessment of the proposed withdrawal which is required to establish the potential impacts to the lake's ecology and its sustainability.

Water Treatment

Four of the options would involve transfer of Missouri River basin water to the Red River basin. We note that each of these options include a requirement for incorporation of a biota water treatment facility.

For three of the water transfer options the treatment is described as coagulation/flocculation, sedimentation and UV disinfection. We are concerned that this level of treatment would be inadequate to minimize the risk of biota transfer. The pretreatment methods described have been shown to be inadequate for inactivating viruses, bacteria and protozoa. Suspended particle removal would depend on the particle fall velocity and the hydraulic residence time in the settling basin. Particles with fall velocity greater than the design value are expected to be fully removed. Those with smaller fall velocities are only partly removed. We normally see this type of treatment as a pre-treatment process; it is not adequate for public water supplies.

Option 7 includes drinking water treatment adding lime softening and microfiltration. This process provides the best treatment because it provides a necessary barrier to biota with the appropriate membrane.

We believe that all of the options that involve transfer of water from the Missouri basin to the Hudson Bay basin should have treatment that eliminates the risk of biota transfer. In this respect, the Government of Canada continues to endorse the International Joint Commission's report to the Governments of the United States and Canada on the Garrison Diversion Unit. The Commission found that an interbasin diversion between the Missouri River and Hudson Bay systems would cause injury to health and property in Canada. Pursuant to the IJC's recommendations, we wish to make clear that the Government of Canada in no way accepts that the approach set out in the Red River Valley Water Needs and Options report meets the standard established by the IJC to eliminate the risk of biota transfer. The issue of biota transfer remains a central concern to Canada. Any treatment technology selected should be informed by sound science, and confirmed through operation of a pilot water treatment plant. Moreover, any approach must conform with the IJC's Garrison principles. Finally, all of the Missouri transfer options should be costed out with the increased level of treatment.

There is a further concern in that the Draft Report does not identify the ultimate owner and operator of the treatment facility. Even if the Bureau builds a treatment plant that satisfies all requirements related to biota transfer, there will be a further need to demonstrate that the plant can be operated and maintained to minimize threats to Canadian waters for the life of the project. An important part of that requirement is for fail-safe concepts to be built into the plant design.

There are a variety of transfer mechanisms by which foreign biota can be introduced into the Hudson Bay basin by a Red River valley water supply feature. These include

Responses to Environment Canada

Response to Comment 11

The report describes a range of treatment technologies designed to meet the requirements of the Boundary Waters Treaty and/or the Safe Drinking Water Act. As required by DWRA (Dakota Water Resources Act), prior to construction of any water systems that would deliver Missouri River water into the Hudson Bay basin, the Secretary of the Interior, in consultation with the Secretary of State and the Administrator of the Environmental Protection Agency, must determine that adequate treatment can be provided to meet the requirements of the Boundary Waters Treaty. Any treatment plant constructed under this project to meet Boundary Waters Treaty requirements would be owned and operated by Reclamation.

catastrophic failures, normal and expected leakage from line joints and connectors, and discharges to the environment of backwash water and residue or sludge from treatment plant processes at water treatment plants in the Red River valley. This sludge may also contain high densities of disinfectant-resistant organisms that will require disposal by some appropriate method. These risks are compounded when human error in both operation and response to system failure is considered.

USGS Report: "Risk and Consequence Analysis Focused on Biota Transfers Potentially Associated with Surface Water Diversions Between the Missouri River and Red River Basins"

We appreciate the opportunity to comment on this report. We note that this report was done at the request of the USBR to support their work related to the Red River Valley Water Supply Options study. We have not yet had a chance to fully review this report, as it was distributed in late August but, given the general conclusions, we have significant concerns about how such a report could be used to inappropriately diminish the potential consequences of interbasin transfers. We say inappropriately because we believe the level of sophistication that this work purports far exceeds the reality of what is understood about the potential for biota transfer by interbasin diversion and the potential consequences.

The report appears to grossly underestimate the consequences of the impact of invasive species on Lake Winnipeg and tends to unrealistically diminish the threats presented by interbasin diversion. Assumptions related to the priority list of species used, the appropriateness of habitat equivalency analysis to measure economic effects, the scope of economic consequences assumed due to invasions and assumed probability distributions for invasions need to be assessed. For example, the characterization of the economic consequences to Canada as being related only to the commercial fishery is totally inadequate. The lake supports a multi-million dollar recreation-based industry that would have to be considered as well as the direct impacts to First Nations on the lake who depend on hunting, fishing and trapping for their livelihood.

Summary

Our primary concern with respect to four of the seven options for increasing water supply in the Red River lies with the threat of transfer of non-native biota from the Missouri basin to the Hudson Bay basin. We consider this issue to be of fundamental importance because it relates directly to the obligations of the United States under the Boundary Waters Treaty. We anticipate that other options and measures that do not require Missouri basin water would be implemented if the analytical approach identified in this letter were adopted. A revised assessment using more realistic water demands and revised project costing would demonstrate that the in-basin options would meet all foreseeable requirements in the service area.

Responses to Environment Canada

Response to Comment 12

Reclamation believes that the risk analysis conducted by the United States Geological Survey accurately portrays the risk of interbasin biota transfer associated with the project. The consequence analysis is intended to provide a context for interpreting the risk. It is not intended to address all potential consequences, however unlikely.

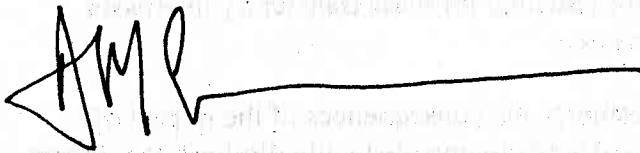
Response to Comment 13

Your comment is noted.

Should an option be selected that incorporates the transfer of Missouri basin water to the Red River watershed, we believe there needs to be a comprehensive environmental assessment. Key elements would include biological surveys to identify potential invasive species; proper design of treatment facilities that would eliminate the threat of transfer of invasive species; proper quality assurance and quality control protocols to ensure the treatment facilities will function as expected; and accommodation for pilot testing of the operation of the treatment facilities to ensure the design and operation of the plant meet expectations. We would also encourage all the alternatives to be compared using a consistent cost-benefit analysis to ensure that the merits of Missouri basin transfer options are properly considered relative to in-basin alternatives. In the absence of such evaluations we would have to consider other options including seeking an IJC reference on the matter.

Once again, thank you for the opportunity to provide comments on the report as part of your public review process. We look forward to having further opportunities to collaborate on these issues.

Yours truly



David McGovern
A/Assistant Deputy Minister
International Relations Directorate
Environment Canada

cc Jim Vollmershausen
Peter Boehm

Extremely urgent:
Recipient please hand deliver to addressee

Urgent:
Réceptionnaire: veuillez livrer immédiatement au destinataire.

INTL PRIORITY

TR MEMIP 536611 02OCT05 10:47
TRK# 8316 2370 8991
58502-ND-US
ISR

FedEx Express Envelope

Form 0412 GFK
XH B1SF



Limitation on Contents / Declared Value /

FedEx Express International Air Waybill

1 **Front**

Sender's FedEx Account Number: 9790 0605
Date: 2488-3952-0

Sender's Name: Michel Gobe
Phone: 919 753 6905

Company: Eucorment Canada
Address: 10 Wellington
City: Gatineau Quebec

2 **Your Internal Reference**: YOWA 687

3 **To**

Recipient's Name: Red River Valley Junior Supply Project
Company: BUREAU OF RECLAMATION
Address: P.O. BOX 1017 (701) 250 4242

4 **Shipment Information**

City: Bismarck
State: North Dakota
ZIP: 58502-1017
Postal Code: 58502-1017

Recipient's Tax I.D. number for Customs purposes: (701) 250-4242

5 **Express Package Service**

FedEx International Priority 6
Available to select locations. Higher rates apply.

FedEx International Economy 7
Not available for select locations.

6 **Packaging**

FedEx 2 Envelope
 FedEx 1X Pak
Includes FedEx Box, FedEx label, and customer pkg.

FedEx 10Kg Box
 FedEx 25kg Box
These options are available for select locations. Product label required.

7 **Special Handling**

HOLD at FedEx Location
 SATURDAY Delivery
Available to select locations. Available for FedEx International Priority only.

Shipper must check
 This shipment does not contain Dangerous Goods.
Dangerous Goods cannot be shipped using this Air Waybill.

8a **Payment Bill transportation charges for:**

Sender Acct. No. in Section 1 will be billed.
 Recipient 3
 Third Party 4
 Credit Card 5
 Cash Cheque 5

8b **Payment Bill Customs charges to:**

Sender Acct. No. in Section 1 will be billed.
 Recipient 3
 Third Party 5
 Cash Cheque 5

9 **Required Signature**

Sender's Signature: *Michel Gobe*
Date Executed: 30/09/05

Use of this Air Waybill constitutes your agreement to the Conditions of Contract on the back of this Air Waybill. Certain international treaties, including the Warsaw Convention, may apply to this shipment and limit our liability for damage, loss, or delay, as described in the Conditions of Contract.

TEFB023708991

PACKAGE LABEL ENVOI ET/OU ÉMBAILLAGE

COMMERCIAL INVOICE LABEL ÉTIQUETTE DE LA FACTURE COMMERCIALE

DELIVERY RECORD LABEL FROM ET/OU À PARTIR DE LA DÉLIVRANCE

831623708991

831623708991

ALL shipments can be subject to customs charges.

MINIMUM 35% POST CONSUMER CONTENT