

RED RIVER BASIN NATURAL RESOURCES FRAMEWORK PLAN



Red River Basin Commission
May 2005

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Red River Basin Commission

The Red River Basin Commission (RRBC) works across the political boundaries of Manitoba, Minnesota, North Dakota, and South Dakota in the United States and Canada to create a shared vision for action with regard to land and water issues. We are an organization with broad representation throughout the Red River Basin.

Vision Statement

The Red River Basin Commission's vision is:

A Red River Basin where residents, organizations and governments work together to achieve basin-wide commitment to comprehensive integrated watershed stewardship and management.

To achieve our vision of *comprehensive integrated watershed stewardship and management* will require maintaining a balance between the functions of natural systems, established over thousands of years, and the use of the landscape for human needs. We must work cooperatively to balance uses within the Red River Basin to support future generations with a productive economy.

Mission Statement

The Red River Basin Commission's mission is:

To develop a Red River Basin integrated natural resources framework plan; to achieve commitment to implement the framework plan; and to work toward a unified voice for the Red River Basin.

This *natural resources framework plan* (NRFP) is a tool that contributes to developing a *unified voice* for the basin, while achieving the RRBC's vision statement. It outlines ways in which projects, programs and activities will enable us to realize our vision of basin-wide watershed stewardship and management. There are other tools that also help create a unified voice for the residents of the Red River basin, such as public education, the RRBC Annual Land and Water Conference, facilitation and mediation.

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RED RIVER BASIN BACKGROUND

There are many complex and interacting factors in the Red River Basin (RRB) that make integrated management of our land and water resources difficult. These factors form the environment within which integrated basin stewardship and management will occur. Learning how to work together in view of these factors is one of the keys to success in achieving the goals of this plan.

Some of the factors that influence land and water management in the RRB include:

- **Landscape** – The RRB is characterized by a very flat, north-south oriented “valley” surrounded by relatively steep escarpments to the east and west. This, coupled with the northward flow of the Red River, results in a naturally flood-prone river basin.
- **Climate and Hydrology** – The variable nature of the basin’s water resources may result in floods or drought occurring within months of each other, or even simultaneously in different areas of the basin (Krenz and Leitch 1993). Climate influences water movement and management of our resources. Annual precipitation generally increases from northwest to southeast within the basin, influencing run-off rates and flow contributions of tributaries to the Red River. The spring thaw begins in the southern end of the basin and moves northward, often resulting in localized flooding due to ice jams as melt-water moves north into still-frozen reaches of the Red River. The potential effects of climate change in the Northern Hemisphere are uncertain, but include changes in snow melt patterns, runoff timing and volume, precipitation patterns, etc. (Gleick 2000). Changes in these features of the hydrologic cycle will have numerous impacts on flooding, water quality and watershed processes.
- **Settlement and Land Use** – The productive soils of the RRB attracted early settlers to the area. The use of waterways as transportation corridors resulted in establishment of towns and homesteads near the Red River and its tributaries and, therefore, made them vulnerable to frequent flooding. With the development of drainage systems initiated in the 1880s, farmland became even more valuable and productive, and formed the basis of the economy in the RRB.
- **Economics** – The Red River Basin economy is influenced directly and indirectly by water, not only in terms of water supply for processing plants, drinking water, etc., but also through the impacts of flooding (e.g., delayed spring planting, disruption to businesses, etc.). Basin-wide flood damages (including both Canada and the U.S.) after the flood of 1997 were estimated at \$5 billion USD/\$6.85 billion CDN (IJC 2000), or \$5.8 billion USD in 2004 dollars. In return, the economy also influences the way we manage water, as solutions for many of the water-related problems in the Red River basin are cost-prohibitive. A large percentage of the economic base in the region is agricultural, thus linking the economy not only to water but to land use as well. For example, in North Dakota, the agricultural sector comprises 24.9% of the state’s economy (Figure 1). The inextricable relationship between water, land use and the economy influences the way that we think about water management in the Red River Basin.

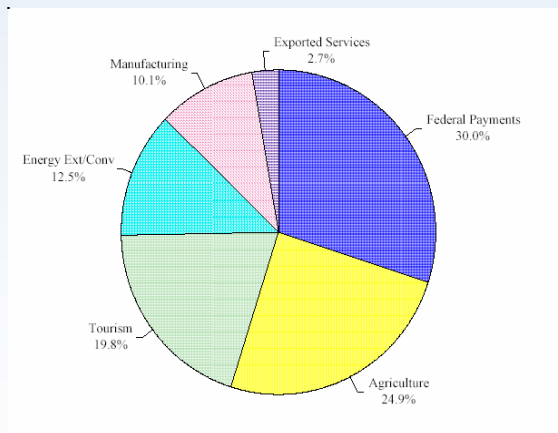


Figure 1. North Dakota economic data for the Red River Basin (after Leistritz et al. 2002)

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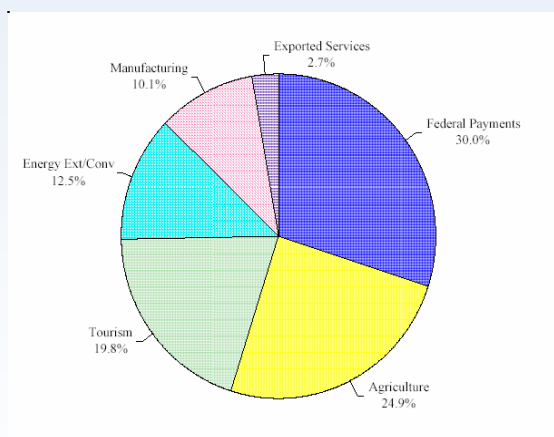


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1.0 Introduction to the Natural Resources Framework Plan

1.1 Why do we need a Framework Plan?

The complex nature of the Red River Basin has resulted in challenges to effective, integrated land and water management. A framework plan will aid in achieving a basin-wide approach to integrated natural resource management, and provides a framework for overcoming political barriers.

Basin-wide approach: Often the solutions to local problems have unintended consequences in other areas of the basin and for other natural resources; for example, raising dikes to reduce the risk of urban flooding may cause increased water levels downstream and impair functioning of natural stream and riparian zones. A basin-wide (and sub-basin) approach to natural resource management instead of a fragmented approach will allow us to find solutions that do not have the potential of exacerbating problems for our neighbors.



Integrated natural resource management: There are diverse natural resource issues and challenges that are of concern to basin residents, including but not limited to frequent flooding, water quality and supply, fragmentation of native prairie habitats, land use and soil loss. We cannot consider each problem or issue in isolation. Solutions for flooding, for example, must include consideration of surrounding land uses, consideration of the impacts to water quality and habitat, etc.

Overcome political barriers: Compounding the complexity of natural resource management issues is the existence of multiple political jurisdictions at the federal, state, provincial and local levels within the Red River Basin's watershed boundaries. This poses numerous challenges to effective, integrated natural resource management. Moving forward with a basin-wide approach will help us overcome political barriers.

As the Red River Basin is a complex watershed, the Red River Basin Commission has been structured to reflect that complexity. Two federal governments, three states and one province, multiple counties and rural municipalities, cities, towns, First Nations and tribes are represented by 41 board members (Appendix I). Further subdivisions of local governments including soil and/or water conservation districts, watershed districts, county and city

associations are all active participants in the Board and its committees. Most importantly, the landowners and citizens within the basin are represented by their elected officials, and their own active participation. The Basin is not just made up of economic statistics, water quality data and jurisdictional boundaries; it is made up of people who care about the land, the water, the natural resources and how they should all be managed in a comprehensive manner. The Commission's broad membership represents the wide range of interests in the basin.



This plan is not simply for the Red River Basin Commission to enact or enforce. Rather, it is a GUIDE to be used by ALL entities in their decision-making processes. It is a guide to use when making choices for activities on the land and in making decisions that have an impact on our water. It is a guide to move the Basin forward with a unified purpose and a unified voice.

1.2 How did we get here?

Inventory Teams

Extensive inventories for each of the selected major resource issues in the RRB were initiated in 1997, precipitated in part by extensive spring flooding throughout the basin. The Inventory Teams, comprised primarily of volunteers from many agencies and organizations and guided by the Red River Basin Board (now the RRBC), spent countless hours reviewing documents from around the basin to compile existing information. The nine inventory teams were divided into the following areas:

- **Flood Damage Reduction**
- **Hydrology**
- **Water Quantity**
- **Fish, Wildlife and Outdoor Recreation**
- **Water Institutions**
- **Drainage**
- **Water Quality**
- **Conservation**
- **Water Law**

Extensive goals and objectives were developed for each of the nine inventory areas upon completion of the Inventory reports. These goals and objectives were publicly reviewed through a series of “Face to Face Forums” held in October 2000 hosted by the RRBB, and adopted by the Red River Basin Commission as the starting point for the Natural Resources Framework Plan (Appendix II), with the exception of the Hydrology, Water Law and Water Institutions inventories. Hydrology goals and objectives appear in the Flood Damage Reduction and Drainage sections of the NRFP. Although there are no goals pertaining to Water Law and Institutions in this document, the information presented in each of those inventory reports was essential in the development of the NRFP.

Guiding Principles

During late 1997, a task force was established by the RRBB to develop Guiding Principles for the organization. The Guiding Principles were intended to enable the RRBB to be consistent in pursuing its vision, mission and goals. The nineteen Guiding Principles were adopted by the RRBB on April 1, 1999, and later by the RRBC. They are as follows:

- Our first priority in evaluating projects is **human health and safety**.
- **Resolution of problems and issues** should be initiated at the appropriate local level, with all interested parties encouraged to participate.
- **Individual and societal needs** will be balanced in seeking resolution of basin resource issues and problems.
- Incentives are preferable to regulations in **developing solutions**.
- The Red River Basin Commission will **encourage regulations to be consistent** within and among jurisdictions.
- The Commission will keep people informed, welcome discussion and **provide opportunities for participation** in its debate and decisions.
- The Red River Basin Commission will seek **comprehensive solutions to resource issues** and problems.
- Water management that is intended to benefit a specific area will be designed to **minimize adverse effects on other areas**.

ment.

- All **development proposals that involve water use**, direct or indirect, will be reviewed for their impact on other existing and potential water uses, as well as their impact on the environment.
- **Conservation is a primary consideration** in meeting water supply needs identified in the Basin.
- The Commission will examine **all sources of water** to maintain and expand the supply available for future needs, both human and economic.
- To minimize flood damage, **water will be retained where practical** in agreement with local, watershed and Basin water management plans.
- All approaches to managing floods and minimizing flood damage will be evaluated for their possible **impact on the economy, community and environment**.
- **Land subject to flooding** should be developed only according to planning guidelines that prevent human suffering and property damage, limit public costs and liabilities, and address the impact on the environment.
- **River, lake, wetland and shoreline habitats** will be preserved, restored, improved and managed for the benefit of Basin residents, the region's economy and the overall environment.
- The Commission's approach to land use issues will balance parallel commitments to **maintaining a prosperous agricultural economy while conserving natural resources**.
- **Natural, cultural and heritage resources** will be conserved and managed to support diversity in the Basin.
- Projects intended to **enhance water quality and quantity** will be designed to maintain and improve the quality of the environment, as well as create economic benefits for the Basin.

1.3 Purpose and Scope of the Framework Plan

The purpose of the NRFP is to provide decision-makers, managers and the public in the Red River Basin with a clear vision for the future and a process to achieve this vision of *comprehensive, integrated watershed stewardship and management*. The NRFP will do this by defining:

- Thirteen comprehensive goals for the basin relating to management of land and water resources (Table 1);
- Objectives for each of the 13 goals that can be accomplished by many basin stakeholders, including the Red River Basin Commission (Table 1);
- Activities, projects and programs that contribute to the goals and objectives (Appendix III, "Red River Basin Action Agenda"); and,
- The process by which the Red River Basin Commission and other entities in the basin may enable attainment of the 13 goals for the basin (Section 9.0, "Putting it all Together").

The goals and objectives in Table 1 were developed based on the Inventory Team Reports and the Face to Face Forums (Section 1.2). They describe areas of improvement, identified by many stakeholders in the basin, necessary to move the Red River Basin toward comprehensive, integrated watershed stewardship and management. The list is by no means exhaustive. Likewise, the Red River Basin Action Agenda (Appendix III) is a preliminary list of activities, projects and programs that further the goals and objectives presented in this document. The Action Agenda will be developed during the first year of implementation of the NRFP, in consultation with the basin stakeholders that are conducting the work (i.e., the activities, projects and programs) that will move us toward

achieving the goals and objectives outlined in Table 1. Once a thorough stakeholder evaluation of the Action Agenda is completed, a gaps analysis can be conducted: what activities, projects and programs are still needed in the Red River Basin? Are there other objectives that might help further the thirteen basin goals that have been overlooked? Are we successfully moving toward comprehensive, integrated watershed stewardship and management in the Red River Basin?

The RRBC's role (addressed in more detail in Sections 1.4 and 9.0) in implementation of the NRFP will be to encourage other stakeholders to work within the "framework" of this plan, by adopting and working toward each of the 13 goals for the basin; to work with other stakeholders in the basin to develop and refine the Red River Basin Action Agenda; and to develop the RRBC Annual Workplan based on an analysis of needs and gaps in the Red River Basin Action Agenda. Although the NRFP was developed by the RRBC with input and guidance from multiple stakeholders, its success is dependent on the support and contributions of basin stakeholders, residents and RRBC members.

The scope of the NRFP:

- Includes the entire RRB watershed from Lake Traverse to Lake Winnipeg including all tributaries (Figure 3);
- Encompasses current, planned and future activities in the basin that contribute to *comprehensive, integrated watershed stewardship and management*; and,
- Focuses on the following issues of concern: flood damage reduction, drainage, water quality, water supply, soil conservation and land use, and fish, wildlife and outdoor recreation (all were identified through the grassroots inventory process).

1.4 How will the Framework Plan be used?

The NRFP serves as a long-term guide for *comprehensive, integrated watershed stewardship and management* in the Red River Basin. It is a living document that will evolve due to political climate, scientific progress, and changing needs throughout the basin. Not only does the NRFP influence the way the RRBC operates, but, hopefully, it will guide all of its member jurisdictions and citizens in their actions as well. To do this, the RRBC will encourage stakeholders in the basin to work within the "framework" of this plan, by adopting and working toward achieving the 13 goals for the basin as outlined in Table 1.

The RRBC has linked an Action Agenda (Appendix III) to the NRFP by listing current activities that contribute to the objectives listed in Table 1, and described above in Section 1.3. This agenda will guide the development of the RRBC Annual Workplan, allow the RRBC Board of Directors to seek out priorities based on current activities and identify future needs. Other entities or stakeholders in the basin will be encouraged to develop their own objectives and/or activities that help to achieve the goals for the basin. During the first year of implementation of the NRFP, stakeholders throughout the basin will be consulted to further develop the Action Agenda. It will require constant review and updating in order to be an effective component of the NRFP.



Table 1. Goals and objectives for comprehensive, integrated watershed stewardship and management in the Red River Basin.

Basin-Wide Goals		<i>Objectives</i>
1.0	Manage natural resources in the RRB by watershed boundaries rather than political boundaries	<p>1.1 <i>Raise awareness of the benefits of basin-wide planning for decision makers and the public</i></p> <p>1.2 <i>Increase coordinated and comprehensive watershed planning</i></p>
2.0	Integrate natural resource management	<p>2.1 <i>Conduct integrated, comprehensive, multi-disciplinary planning efforts, policies, projects and programs that accommodate a balance in resource preservation, conservation and consumption</i></p> <p>2.2 <i>Apply conservation criteria in the review and approval of all land-use plans, projects and programs</i></p>
3.0	Increase applied research and data management to support decision-making	<p>3.1 <i>Distribute data and research to decision makers</i></p> <p>3.2 <i>Standardize collection, storage and sharing of land and water resources data</i></p> <p>3.3 <i>Develop and use standardized technical models to support decision making</i></p> <p>3.4 <i>Develop and use Geographic Information Systems for data management and planning</i></p>
4.0	Improve stakeholder participation and awareness of land and water issues	<p>4.1 <i>Develop a stewardship ethic in the Red River Basin</i></p> <p>4.2 <i>Provide comprehensive watershed education and outreach for all audiences/ stakeholders</i></p> <p>4.3 <i>Provide opportunities for early involvement of project stakeholders</i></p> <p>4.4 <i>Increase awareness of the economic and environmental benefits of assistance programs available to landowners and decision-makers in the U.S. and Canada</i></p>
Flood Damage Reduction		
5.0	Maintain state-of-the-art flood forecasting tools for the Red River Basin	<p>5.1 <i>Increase data availability and level of coordination between jurisdictions for flood forecasting and planning</i></p>
6.0	Reduce risk of flood damages for people, property and the environment in the mainstem floodplain and in tributary watersheds	<p>6.1 <i>Implement flood mitigation measures that reduce risk to individuals and communities on the mainstem and tributaries</i></p> <p>6.2 <i>Implement flood mitigation strategies in the upper basin (escarpment and beach ridges) that reduce risk locally and downstream</i></p>
7.0	Ensure that flood (natural disaster) response and recovery programs meet the needs of all RRB residents	<p>7.1 <i>Increase availability of response and recovery programs that are adequate and equitable to residents in all jurisdictions</i></p>

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Basin-Wide Goals		Objectives
Drainage		
8.0	Maintain urban and agricultural drainage systems to enhance productivity while minimizing impacts to others	8.1 Manage drainage systems to protect agricultural land (using 10 year/24 hour or better criteria) and to minimize environmental impacts
		8.2 Design and improve drainage systems with consideration of local, sub-watershed and mainstem effects
		8.3 Design and implement urban and rural storm water strategies that minimize environmental impacts
Water Quality		
9.0	Maintain, protect and restore surface and ground water quality in the Red River Basin	9.1 Develop a common approach to defining, setting, monitoring and assessing water quality goals and conditions in the Red River Basin
		9.2 Develop scientifically based water quality restoration goals for impaired water bodies in the basin
		9.3 Reduce point-source and non-point source (NPS) pollution to protect basin surface and ground water
		9.4 Develop coordinated strategies to reduce loadings of nutrients to Lake Winnipeg by 10% within five years to support the recommendations of the International Joint Commission's International Red River Board
		9.5 Encourage respect for all existing water quality standards, objectives and guidelines within the basin, including those established by the International Joint Commission at the international boundary and those established by other jurisdictions
		9.6 Develop and coordinate programs to prevent the further spread of non-native aquatic species presently within the basin and to prevent the introduction of new species to the basin
Water Supply		
10.0	Ensure the appropriate use and sustainability of the Basin's surface and ground water	10.1 Develop a basin-wide strategy to meet current and projected water supply needs
		10.2 Develop water supply emergency management plans for contamination, drought and flooding
		10.3 Develop an understanding of the approaches and differences in minimum in-stream flow criteria to maintain and protect all users

Table 1. Goals and objectives for comprehensive, integrated watershed stewardship and management in the Red River Basin.

Basin-Wide Goals	Objectives
Soil Conservation	
11.0 Increase soil conservation efforts within the basin	<p>11.1 Increase availability of conservation programs to landowners through establishment of appropriate delivery organizations</p> <p>11.2 Manage land and land uses to minimize runoff and maintain soil on site (i.e., through the use of Best Management Practices)</p>
Fish, Wildlife and Outdoor Recreation	
12.0 Conserve, manage and restore diversity and viability of native fish and wildlife populations and their habitats	<p>12.1 Maintain, enhance and protect aquatic and terrestrial populations</p> <p>12.2 Enhance, protect or restore natural systems (natural floodplains, stream functions, riparian areas, wetlands, grasslands and woodlands)</p> <p>12.3 Enhance or develop corridors between habitat blocks</p> <p>12.4 Identify and protect rare and unique species, habitat types and plant communities</p>
13.0 Enhance and develop recreational infrastructure and access to the Basin's natural resources	<p>13.1 Increase awareness and participation in outdoor recreational opportunities by the general public</p> <p>13.2 Promote unique RRB habitats to enhance economic development and quality of life</p>



■ 2.0 Framework Goals

During the Inventory process (Section 1.2), common themes emerged from the information gathered by each of the nine Inventory Teams. The Inventory Teams identified one or all of the following issues of importance in the Red River Basin:

- Using watershed boundaries rather than political boundaries to manage water resources;
- Integrated natural resource management;
- Coordinated basin-wide research and data collection; and,
- Education and outreach for all basin residents.

These four issues are the cornerstone of this natural resources framework plan. Goals 1.0 – 4.0 (Table 1) were developed to address these issues for the basin, and include a series of objectives that will help attain these goals.

Using watershed boundaries (rather than political boundaries) to manage water resources is the overriding goal for the Red River Basin (goal 1.0). In order to accomplish this, the RRBC will continue to raise awareness of the benefits of watershed planning (objective 1.1). This *natural resources framework plan* is one tool that the RRBC will use to raise awareness and encourage the use of watershed-level planning. The RRBC will also continue to encourage coordinated and comprehensive watershed planning (objective 1.2), such as the efforts of the Pembina River Basin Advisory Board and the Roseau River International Watershed.

Integrated natural resource management (goal 2.0) in this context means (1) that it is preferable to manage a given resource without compromising other resources, and (2) that multiple use projects that provide benefits to many natural resources are encouraged. Objectives 2.1 and 2.2 focus on integrated natural resource management at the local level.

Research and data collection is generally undertaken by various institutions and agencies in the basin; however, many inventory teams identified gaps between collection of data in each jurisdiction and sharing of that data between jurisdictions and with local decision makers (goal 3.0). Objectives 3.1-3.4 can be achieved by agency cooperation and communication of research results to local governments.

Education and outreach is the cornerstone to achieving comprehensive, integrated watershed stewardship and management; therefore, improved stakeholder participation and awareness has been identified in goal 4.0. Achieving this goal starts with watershed education for school children and adults (objective 4.2). Fostering general public awareness occurs through activities such as newsletters, conferences, community based social marketing, citizen monitoring programs and outreach to private landowners (objectives 4.2 and 4.4). Education and outreach seek to increase awareness and participation of stakeholders (objective 4.3) and ultimately to foster a stewardship ethic in basin residents (objective 4.1).

■ 3.0 Flood Damage Reduction

Flooding is a recurring event throughout the Red River Basin with severe social, economic and environmental consequences. Flooding may cause direct physical impacts to infrastructure (bridges, roads, water supply works, etc.), agricultural land and other property, water quality of receiving waters and groundwater and riparian habitat. Flooding also causes human health and psychological effects. Flood damage reduction (FDR) measures include

those that affect the flood itself such as upper basin storage, those that protect flood-susceptible property such as levees and those that address damages incurred such as a disaster response network (RRBB 2000a). Because flooding/drought cycles influence human perceptions regarding the importance of water conservation and FDR measures, a challenge in implementing FDR measures is maintaining public and political interest between major flood events.

The need for flood damage reduction has increased with modern settlement and subsequent population growth along the Red River and its tributaries. The Inventory Team defined FDR as “*the reduction of physical and emotional impacts to humans and the reduction of damages to property and the natural environment caused by flooding*” (RRBB 2000a).

3.1 FDR Framework For The Future

The Red River Basin Commission has identified the following as a desired future condition in the basin:

People, property and the environment in the Red River Basin will be at lower risk of flooding and flood damages in the future.

The following areas were identified by the International Joint Commission (IJC) as components of a proposed basin-wide *Comprehensive Flood Mitigation Plan*. They are key components to achieving the above Framework for the Future for the basin, and have been incorporated into the following goals.

Flood Forecasting for the Basin

Flood forecasting is the first line of defense for reducing flood damages in the Red River Basin; therefore, development of state-of-the-art tools for flood forecasting has been identified as goal 5.0 in Table 1. Standardized data collection to facilitate development of forecasting tools (objective 3.2) and increased coordination and sharing of data between the U.S. and Canada (objective 5.1) are ways to reduce the risk of flood damages (through forecasting) for Red River Basin residents.

Flood Mitigation Measures for Basin Property

Reducing the risk of flood damages on the mainstem and tributaries through structural and non-structural mitigation measures is the focus of goal 6.0 (Table 1). Appropriate structural measures may include dikes, ring dikes, floodways and elevation of property. Non-structural methods such as buy-outs, floodplain management, green spaces and stream restoration (Aadland et al. 1998) not only provide flood damage reduction benefits, but also contribute to *integrated natural resource management* (goal 2.0) by increasing wildlife habitat, providing natural buffers for water quality and maintaining stream flow for water supply. Mitigation measures in the upper basin (objective 6.2) are part of developing a basin approach (objective 1.1) to flood damage reduction.

Flood Response and Recovery for Basin Residents

The risks of flooding cannot be completely eliminated – flooding is a natural process in the Red River Basin. Response and recovery programs in the basin deal with the aftermath of flooding, when it occurs (goal 7.0). Because each jurisdiction manages natural disasters differently, continuity in all response and recovery programs and equitability for all residents of the basin are still needed in the Red River Basin (objective 7.1).

■ 4.0 Drainage

Natural drainage patterns evolved with the receding of glacial Lake Agassiz, forming meandering channels to convey slow-moving water over the glacier-scoured landscape. Natural drainage, however, is often inadequate to

convey flood waters and to prevent damage to various human land uses, in particular, urban areas and agricultural land in the Red River Basin. Therefore, natural drainage has been augmented by artificial (“man-made”) drainage throughout the RRB. The Drainage Inventory Team defined artificial drainage as “*modification of the hydrology of the land by providing drainage systems to convey surface or subsurface water from agricultural or developed areas*” (RRBB 2000b). Controversy and conflict surrounding drainage often originate at jurisdictional boundaries (RRBB 2000b), emphasizing the need for a watershed approach to drainage.

Impacts of drainage on other ecosystem components are poorly understood, and a wide spectrum of viewpoints exists. Krenz and Leitch (1993) reported that some individuals believe the RRB, without drainage, would be a useless swamp, whereas others believe that current water management and flooding problems could be alleviated if artificial drainage structures were removed. Drainage systems have resulted in the disappearance of a large percentage of natural wetlands in the RRB, may exacerbate downstream flooding under certain circumstances and often contribute large amounts of sediment to the receiving water body if improperly constructed or maintained. The recent advent of subsurface or tile drainage systems has resulted in a need to study these systems in terms of water quality and hydrologic impacts.

Agricultural Flood Damages

The annual nature of agricultural flood damages in the RRB has been identified as a threat to agricultural production; however, these damages are difficult to quantify, are not widely publicized and differ based on spring or summer flood events (RRBFDRWG 1998, p. 7).

Reducing flood damages to intensively farmed agricultural land was adopted as a goal by the RRB Flood Damage Reduction Work Group (Minnesota) after an extensive mediation process. The 10-year summer storm event was identified by the Work Group as the target for reducing flood damages. A 10-year event in the Minnesota portion of the Red River Basin is technically defined as:

“...3.57 inches [9.0 cm] of rainfall in a 24-hour period, or 6.39 inches [16.2 cm] of rainfall in a ten-day period, in a minor watershed, i.e., ten square miles [26 km²] or less” (RRBFDRWG 1998, page 8)



These numbers were adopted by the Minnesota FDR Work Group from the Natural Resource Conservation Service (NRCS) Hydrology Guide, which includes a series of rainfall frequency maps. The 10-year, 24-hour rainfall amount varies from 3.3 to 3.8 inches (8.4 to 9.6 cm) in the Minnesota and North Dakota portions of the Red River Basin; data provided by the province of Manitoba indicate a similar range of values (Bowering 2004).

In probabilistic terms, if a section of land is protected against a 10-year event, there is a ten percent chance in any single year of being flooded by runoff from neighboring property as a result of a summer storm event. Conveyance systems designed to a 10-year standard have the ability to convey the runoff from a 10-year storm event without overflowing – allowing for the drainage of intensively farmed land to prevent crop damages (RRBFDRWG 1998).

Using the 10-year event as our primary goal indicates that we are able to live with the level of risk that will remain – i.e., a 25-year storm event will exceed the level of protection afforded by 10-year design ditches and will result in damage to agricultural land. In addition, the 10-year design will not incorporate protection from conditions that lead to spring flooding in the RRB. Drainage systems on the valley floor may enhance storage of overland flood-water during spring floods due to extremely low slopes – managing water based on the “early, middle, late” concepts of the RRBFDR Work Group Technical and Scientific Advisory Committee will alleviate misconceptions that agricultural drainage causes flooding in the Red River Basin.

4.1 Drainage Framework For The Future

The Red River Basin Commission has identified the following as a desired future condition in the basin:

Natural and artificial drainage systems will be managed to enhance the region's agricultural economy, while minimizing water quality impacts, flooding impacts and natural resources damages.

The following areas have been identified as key components to achieving this future condition for the basin:

Agricultural Production

Ultimately, agricultural drainage systems are managed to maximize agricultural production. Flood damages to agriculture occur from delayed spring planting and reduced crop yields; therefore, managing drainage systems to provide spring and summer flood protection is emphasized in objective 8.1 (Table 1). Future flood damages could also be minimized by taking marginally productive land out of agricultural use and adopting conservation practices (goals 11.0 and 12.0).

Designing ditches appropriately will extend their life-span, reduce maintenance requirements, and ensure their effective operation (objective 8.2). For example, reducing slope will minimize slumping, filter strips will reduce the rate of sedimentation, and controlled field release to ditches will ensure appropriate use of ditch capacity.

Minimize Flooding Impacts

Local drainage projects often have unintended consequences downstream – ranging from the adjoining property owner to water bodies hundreds of miles downstream. Under certain conditions in the Red River Basin, some tributaries and drainage systems exacerbate flooding on the mainstem Red River in the spring, whereas spring runoff from other tributaries does not coincide with flood peaks on the mainstem Red River. In order to minimize unintended consequences, managing drainage systems must take place on a comprehensive, watershed or sub-watershed basis (objective 8.2).

Minimize Water Quality Impacts

Drainage systems, both agricultural and urban, are conduits for land-based substances that impair water quality, such as sediment, animal waste, lawn chemicals, oils, fertilizers and pesticides. Managing drainage systems appropriately can minimize the impacts of these pollutants on downstream water bodies (objective 8.3). Best Management Practices such as vegetated filter strips and grassed waterways (objective 11.2) act as buffers between development (urban or agricultural) and water bodies (drains, streams, rivers, lakes, wetlands).

■ 5.0 Water Quality

Water quality problems in the Red River Basin are related to both non-point and point sources of pollution. Non-point source pollution, unlike pollution from industrial and sewage treatment plants (point sources), is diffuse in nature. Non-point source pollution is transported by runoff from precipitation or snowmelt, and ultimately deposited into lakes, rivers, wetlands and underground sources of drinking water (EPA 2004), and includes:

- Excess fertilizers, herbicides and insecticides from agricultural lands and residential areas;
- Oil, grease and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Salt from irrigation practices;
- Bacteria and nutrients from livestock, pet wastes and faulty septic systems.

Point sources of pollutants include discharges from municipal and industrial wastewater treatment facilities, urban runoff, including combined sewer overflows, and discharges from intensive or confined livestock holding areas.

Pollution in the Red River Basin is regulated by the U.S. Clean Water Act (CWA 1972), the Canadian Environmental Protection Act (CEPA 1999), the Manitoba Environment Act (1988) and the Manitoba Water Quality Standards, Objectives, and Guidelines (2002). Although point-source pollution has been reduced significantly in the U.S. and in Canada since the 1960s and 1970s, municipal and industrial sewage treatment discharges are still a significant source of nutrients (nitrogen and phosphorus) to surface waters. However, within the Red River Basin, studies also indicate that a large proportion of both phosphorus and nitrogen are contributed in runoff from lands with spring snow-melt events.

Recently, Lake Winnipeg has become a primary concern in the Red River Basin, due to its declining water quality. Lake Winnipeg is the final receiving body for the Red River, as well as several other large river systems draining western Canada and smaller systems draining eastern Manitoba. Although the Red River and many of its tributaries are naturally turbid or “muddy” due to geology and topography, human activities on the landscape result in additional sediment and nutrient loading to surface waters, which often impair their recreational, industrial, municipal and aquatic habitat uses. Sources of nutrients may include large sewage treatment plants in the major cities located along the Red River and its tributaries, sewage lagoons that serve smaller communities, industries throughout the basin, septic fields, soil particles that are transported by runoff (non-point sources) and movement of dissolved forms of nutrients with spring snow-melt.

5.1 Water Quality Framework For The Future

The Red River Basin Commission has identified the following as a desired future condition in the basin:

Existing water and biological quality will be maintained and protected and water quality improvements in the Red River Basin will be achieved by reducing point source and non-point source pollution in the mainstem, tributaries and Lake Winnipeg.

Basin Approach to Water Quality Goals and Monitoring

Consistency in water quality monitoring, standards and assessment is needed throughout the basin. Each jurisdiction conducts monitoring activities that reflect individual needs, priorities, and available resources. A basin-wide approach (objective 9.1, 3.2) would facilitate consistency in programs of study, and the ability to assess water quality on a basin-wide scale; however, respect for existing jurisdictional water quality standards is encouraged (objective 9.5).

Restoration

Each jurisdiction identifies impaired water bodies – that is, water bodies that do not meet their beneficial uses because water quality is impaired. Although this is required for each U.S. state, Manitoba is not required by law to list its water quality impairments. Because water quality standards vary by jurisdiction, so do the interpretation of water quality impairments and, therefore, restoration goals (objective 9.2). For multi-jurisdictional water bodies like the Red River, which forms the state border between North Dakota and Minnesota, water quality restoration efforts are complicated due to varying standards and restoration goals.

Reducing Pollution & Non-Native Species

In general, the Basin’s surface and ground water quality can be improved through programs to reduce non-point and point-source pollution (objective 9.3). Point sources such as sewage treatment facilities and lagoons can be upgraded to reduce nutrient loadings to surface water (objectives 9.3 and 9.4). Non-point source pollution from diffuse sources can be reduced by implementation of Best Management Practices (BMPs) for all land uses (objec

tive 11.2), including construction sites, agriculture, and urban and rural storm water systems. The spread of non-native aquatic species is a threat to North American ecosystems and economic considerations; therefore, a coordinated effort to prevent the introduction and spread of aquatics is needed in the Red River Basin (objective 9.6).

■ 6.0 Water Supply

Primary categories of water use in the Red River Basin include municipal and industrial, rural domestic, livestock, irrigation, outdoor recreation and fish and wildlife (Krenz and Leitch 1993). The availability of water resources to meet these uses is variable, especially since residents of the RRB may endure drought and floods in the same year.

Surface Water

Because the availability of surface water in the RRB is highly unpredictable, a constant concern of communities that rely on surface water for their municipal and industrial needs is the possibility of an extended drought (RRBB 2000e). A number of communities use the Red River or its tributary systems as their primary source of water, including Fargo, Grand Forks, Drayton, Valley City, Grafton, Mayville, Park River, Pembina and Langdon in North Dakota; Moorhead, East Grand Forks, Thief River Falls and Fergus Falls in Minnesota; and Morden, Carman, Killarney, Boissevain, Selkirk, Winkler and Altona in Manitoba (RRBB 2000e).

Groundwater

Groundwater is the primary water source for most rural residents and a number of towns and municipalities in the RRB (RRBB 2000e). In Manitoba, the availability of fresh groundwater varies from excellent east of the Red River to poor west of the Red River. In the U.S., there is limited potential for future development of aquifers; therefore, most communities in North Dakota and Minnesota will not be able to rely on groundwater supplies to meet future water use expansion needs (RRBB 2000e).

Future Needs

Although dry periods experienced in the past have been weathered by municipal and industrial water supplies, future droughts coupled with projected population growth for the larger towns and cities in the basin may prove jeopardizing to current water supply infrastructure. As such, the U.S. Bureau of Reclamation has undertaken the development of an Environmental Impact Statement on the Red River Valley Water Supply Project. The project is intended to “identify reliable sources of water of sufficient quantity and quality to supply homes, businesses, industries, wildlife, and recreation in the Red River Valley within North Dakota through at least the next five decades. This project is required, and authorized, by the Dakota Water Resources Act of 2000” (Bureau of Reclamation 2004).

Other planning efforts are typically undertaken at a smaller scale. The Province of Manitoba has developed several aquifer management plans, including the Winkler Aquifer in the Red River Basin and the Assiniboine Delta Aquifer in the Assiniboine River Basin. The Pembina Valley Water Cooperative plans for water supply needs in the southwestern portion of Manitoba (the northwestern part of the Red River watershed).

6.1 Water Supply Framework For The Future

Every resident of the Red River Basin will have adequate, clean water to address their basic human need and their ability to earn a living.



Sustainability of Surface and Groundwater supplies

Ensuring the appropriate use and sustainability of the Basin's surface and groundwater supplies is an essential component of providing residents of the Red River Basin with adequate clean water. A basin-wide strategy for water supply is the first step in planning for appropriate use (objective 10.1). The Bureau of Reclamation's Red River Valley Water Supply Project will contribute to this objective, although it does not specifically address water supply needs for Manitoba or Minnesota communities (with the exception of Breckenridge, East Grand Forks and Moorhead, MN). Comprehensive, integrated planning and management to accommodate a balance in resource preservation, conservation and consumption (objective 2.1) and improving stakeholder awareness of land and water issues (goal 4.0) will foster sustainability and a stewardship ethic for the appropriate use of water supplies.

Development of emergency plans (objective 10.2) and minimum in-stream flow criteria (objective 10.3) will protect, respectively, water supply and other in-stream needs – typically fish and wildlife, water quality, and navigation. In-stream flow criteria have not been widely adopted in the Red River Basin, although Manitoba has recently developed these for the Assiniboine River.

■ 7.0 Soil Conservation

The Conservation Inventory Team defined conservation as:

“sustainable development within the Red River Basin through the management and maintenance of resources in order to assure their use by future generations.”

Sustainable development is commonly defined as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs.” Conservation through sustainable development applies equally to all of the natural resource issues of concern addressed elsewhere in this document: water quality and supply, flooding and drainage, fish and wildlife, etc. Because these issues are addressed previously, this section will deal specifically with soil conservation.

Soil is eroded by both wind and water in the Red River Basin. Soil erosion is a concern on cultivated fields, construction sites, roadside ditches and urban storm drains. Conservation of this valuable soil resource is essential for sustainable agriculture – when topsoils erode from cultivated fields, productivity declines and results in the need for added fertilizer. Conservation of soil within urban areas is also essential for the prevention of sedimentation and contamination of receiving water bodies. Because sedimentation has been recognized as the predominant water quality issue in impaired waters, not only in the Red River Basin but also in other parts of North America, soil conservation is one of the tools we can use to improve water quality and agricultural sustainability for future generations.

7.1 Soil Conservation Framework For The Future

There will be local delivery organizations throughout the entire Red River Basin to implement local, state, provincial and federal conservation planning efforts.

Conservation programs

A primary finding of the Conservation Inventory Team (RRBB 2000f) was limited delivery of conservation programs (objective 11.1), resulting in poor participation. Top-down programs from the federal, state and provincial governments need adequate funding and delivery agencies in order to facilitate participation by landowners. Increased participation in conservation programs can also be achieved through increased awareness of their economic and environmental benefits (objective 4.4)

Best Management Practices

Best Management Practices (BMPs) for land use and land management minimize impacts of human disturbance to natural systems (objective 11.2). They are common in construction, agriculture, forestry, urban stormwater systems and other land uses. Implementation of BMPs is critical not only for soil conservation in the Red River Basin, but also for protecting water quality through reduction of non-point source pollution (objective 9.3) and protecting natural habitat (goal 12). BMPs are site-specific and differ by land use and geography. Some examples for minimizing soil transport into waterways include riparian buffer zones (natural or restored), grassed waterways, vegetated filter strips, tillage practices such as conservation tillage, stormwater detention basins, etc.

■ 8.0 Fish, Wildlife and Outdoor Recreation

Natural landscapes throughout the Northern Great Plains in the U.S. and Canada have been substantially altered due to human land use. Less than one percent of native tallgrass prairie remains (RRBB 2000g). On average, seventy percent of wetlands have been lost in the U.S. and Canadian portions of the Northern Great Plains (Ducks Unlimited 2004). Of the 10 million hectares in the RRB, 80% is agricultural land use and 9% is forest and rangeland (USGS in RRBB 2000g). These land use changes have resulted in fragmentation of natural habitats – riparian habitats, wetlands and lakes, prairies and grasslands and woodlands. Although many wildlife species, for example white-tailed deer, pheasants and waterfowl, have thrived in this fragmented landscape, there are many other species that are unable to adapt to changing land uses because they are more restrictive in their habitat needs or less able to migrate to appropriate habitat (RRBB 2000g).

Wildlife of all forms provide recreation opportunities for residents and visitors to the Red River Basin. Although it is difficult to obtain statistics regarding the direct economic benefits and spin-offs of outdoor recreation in the Red River Basin, there are readily available statistics by state or province. Some of these, reported in the Fish, Wildlife and Outdoor Recreation Inventory Report (RRBB 2000g), include:

- Hunters spent \$635 million in Minnesota and North Dakota in 1998 on gas, food, lodging and gear.
- The state of Minnesota considers wildlife viewing to be a \$400 million industry (MN DNR 2004). This doesn't account for any hunting or fishing revenue.
- In 2000, there were 10 birding festivals held in North Dakota and Minnesota. In Manitoba, an annual birding festival takes place at Delta Marsh.
- The Minnesota Ornithologists' Union (2004) states that bird watching is a sport or hobby that is done by 40% of all Minnesota residents.

In addition to wildlife viewing, hunting and fishing, there are many opportunities for activities such as canoeing, cross-country skiing, camping and other outdoor recreation in the Red River Basin. However, outdoor recreation has not neared its maximum potential in the RRB. Enhancement of the recreation and tourism industries in the basin will bring additional tourism dollars, hunting and fishing revenues, environmental awareness, and economic incentives to restore and protect existing and degraded habitats.



8.1 Fish, Wildlife and Outdoor Recreation Framework For The Future

Abundant wildlife, healthy habitats and balanced outdoor recreation in the Red River Basin will be provided through restoration, preservation and appropriate management of natural resources.

Conserve and manage diversity

Enhancing and protecting aquatic and terrestrial populations (objective 12.1) will require habitat protection (objective 12.2), development of corridors between existing habitat blocks (objective 12.3) and identification and protection of rare and unique species and habitats (objective 12.4).

Recreational opportunities

Increased awareness and participation in outdoor recreational opportunities for the general public (objective 13.1) will require environmental education and the development of a stewardship ethic (objectives 4.1, 4.2). Promoting unique habitats as a tourism/outdoor recreation benefit (objective 13.2) will help to enhance access to natural resources as well as enhancing quality of life for all basin residents.

■ 9.0 Putting It All Together

This section describes how the goals and objectives of this framework plan will be achieved. While the plan was developed by and helps direct the activities of the RRBC, it is widely acknowledged that real progress toward achieving these goals for the RRB can only be realized if all jurisdictions do their part to contribute to the vision of *comprehensive integrated watershed stewardship and management*. The RRBC, federal, state, provincial and local governments and non-governmental organizations working in the RRB share in the responsibility for plan implementation. Because of its basin-wide role and mission, the responsibilities of the RRBC are listed below, followed by the role of the various jurisdictions.

9.1 Red River Basin Commission Plan Implementation

The RRBC has three primary responsibilities to achieve the goals of this framework plan:

- Pursuit of the objectives listed in Section 2.0, Table 1;
- Preparation of an Annual Workplan, based on the “Red River Basin Action Agenda;”
- Review and critique of RRB plans and projects for consistency with the NRFP goals and the RRBC Guiding Principles.

As the goals listed in Table 1 are comprehensive and far-reaching, so also are the objectives that are listed with them. However, these objectives cannot all be achieved at the same time, or by one authority or stakeholder. In some cases, the objectives are written as a sequence of steps that must be taken over time. In any case, it will be the responsibility of the RRBC each year to establish its priorities from among the objectives and Action Agenda. This prioritization will certainly take into account relevant political, social and funding factors. However, it is also expected that the RRBC Board will be able to look beyond the current situation and take a visionary approach to setting the agenda for which issues to address.

Based on the priorities established each year by the RRBC Board, the staff will then apply those to an annual workplan that will assign staff and funding resources to accomplish specific tasks taken from the general Action Agenda tasks identified in Appendix III. As described in Section 1.3, the Action Agenda will be developed during the first year of implementation of the NRFP, and will be reviewed and revised periodically thereafter. Each year's

workplan will be submitted to the RRBC Board for approval and the Board will receive regular status reports of the tasks accomplished during the year.

As a coordinating body with a basin-wide perspective, the RRBC is in a position to survey the work being done by others within the Basin. The third key role of the RRBC is to examine those programs, plans and projects and determine their consistency with the NRFP goals and the RRBC Guiding Principles. This process will assist in developing a common basin vision and unified voice. It is hoped that as the credibility of the NRFP grows, member jurisdictions will freely volunteer their plans and projects for review by the RRBC in this manner. It is expected that plan and project review will be a regular agenda item at RRBC meetings.

9.2 Plan Implementation By Other Jurisdictions

The RRBC readily acknowledges that as an organization it lacks the legal authority to compel compliance with its plan and programs. Consequently, implementation of the NRFP goals will depend largely on the degree to which the various jurisdictions in the Basin are willing to direct their resources to achieving those goals. While the RRBC is expected to serve the role of a convener and coordinator for Basin water and resource management activities, it is the agencies and local governments that have the real authority, skilled staff and financial resources to get the majority of the work done.

In order to achieve NRFP goals, as RRBC's NRFP credibility and usefulness grows, it will become common practice for RRB jurisdictions to:

- Participate in RRBC sponsored inter-jurisdictional issue forums;
- Participate in implementation of the NRFP by sharing objectives and actions from their respective workplans that address basin goals; and,
- Submit plans, projects and programs affecting RRB resources to RRBC review.

For some issues, the RRBC staff may convene inter-jurisdictional forums to address specific priority issues. In these cases, government and non-government representatives will be requested to participate at a level that will serve to build commitment by their organization to implementation of agreed upon actions.

Implementation of the NRFP is hoped to be an interactive process. Each jurisdiction is encouraged to share the components of their workplans that relate specifically to NRFP goals and objectives. Over time, this may result in the development of new objectives for the thirteen goals in the NRFP (see Section 9.3 below).

Finally, when jurisdictions propose plans, projects or programs that impact or intersect with adopted goals of the NRFP, it is hoped they will be willing to present those to the RRBC Board for review and determination of consistency with the NRFP and/or the RRBC Guiding Principles.

9.3 Plan Review and Updates

The RRBC is also responsible to rigorously review and update the goals and objectives of the NRFP both on a regular basis (e.g., every 5 years) and also in response to significant new opportunities or threats within the RRB environment. These review and update episodes will include public consultation opportunities. The NRFP, and in particular the Action Agenda, is fully intended to be a living document that will remain relevant to the real needs and priorities of the citizens of the Basin and will serve as an effective guide to the application of the public's resources to achieve *comprehensive integrated watershed stewardship and management*.



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Appendix I. Governing Documents Article V: RRBC Members

COMPOSITION/ELECTIONS/APPOINTMENTS/VACANCIES

The organization will be inclusive. The structure will consist of three bodies: 1) Members, 2) RRBC Board of Directors, and 3) RRBC Executive Committee. Other Committees shall be established according to the Bylaws or Operating Procedures.

Section 1. RRBC Members: The RRBC will consist of unlimited at-large members, as per the RRBC Operating Procedures. The RRBC Members will meet formally once a year at the Annual Meeting, although members may attend Board of Directors, Executive Committee or any other committee meetings.

Section 2. RRBC Board of Directors: The Board of Directors shall consist of forty-one (41) members. Thirty-one (31) members of the Board of Directors shall be local representatives and ten (10) shall be provincial/state representatives. The Board of Directors shall select ex officio representatives as defined below. Term of office shall be two (2) years and until successors are duly nominated and elected or appointed.

A. Local Representatives: Manitoba, Minnesota and North Dakota shall each have ten (10) local representatives, nine (9) appointed and one (1) at-large elected by members present at the Annual Conference. One local at-large representative shall be elected from the State of South Dakota by members present at the Annual Conference. One (1) from each jurisdiction shall represent the local funding source. The appointed representatives shall be as follows:

1. From Manitoba:
 - a. One (1) representing Winnipeg.
 - b. One (1) representing Selkirk.
 - c. One (1) representing Pembina Valley Cooperative.
 - d. One (1) representing RM's – South.
 - e. One (1) representing RM's – South along mainstem.
 - f. Two (2) representing RM's – North.
 - g. One (1) representing Environmental.
 - h. One (1) representing Tribal.
2. From Minnesota:
 - a. Three (3) representing cities.
 - b. Two (2) representing counties.
 - c. Two (2) representing watershed districts.
 - d. One (1) representing Environmental.
 - e. One (1) representing Tribal.
3. From North Dakota:
 - a. Three (3) representing cities.
 - b. Two (2) representing counties.
 - c. Two (2) representing water resource districts.
 - d. One (1) representing Environmental.
 - e. One (1) representing Tribal.



- B. Provincial/State Representatives: Ten (10) members appointed by the Premier or Governor of the respective jurisdiction to provide fair representation of water issues from quantity, quality and other perspectives. One (1) from each jurisdiction shall represent the provincial/state funding source. These representatives shall be ratified at the annual meeting.
- Three (3) appointed by the Governor of Minnesota.
 - Three (3) appointed by the Governor of North Dakota.
 - Three (3) appointed by the Premier of Manitoba.
 - One (1) appointed by the Governor of South Dakota.
- C. Federal Representatives: The RRBC may invite federal departments or agencies to name federal representatives as ex officio, non-voting members to the RRBC. The number of and which specific federal departments/agencies to be invited will be at the discretion of the RRBC. These representatives shall be ratified at the annual meeting.
- D. All elections/appointments shall be made in accordance with the Operating Procedures.

Erratum: The Tribal local representatives are incorrectly listed as being selected by state/province. In actuality, they are selected by the Tribes or First Nations without regard to U.S./Canadian political subdivisions.



Appendix II: Original Goals and Objectives

FLOOD DAMAGE REDUCTION: Inventory Summary

The FDR Inventory Report briefly described historical flooding in the RRB, summarized flood damages and flood recovery costs for each jurisdiction during 1993-1998, and examined the responses of provincial, state and federal agencies. Projects, programs and legislation for reducing flood damages were discussed in the Team's report, along with problems and obstacles to implementation of FDR projects. The identification of these obstacles led to the Inventory Team's original development of goals and objectives for FDR.

GOAL 1: Reduce flood damages in the Red River Basin, through a watershed approach.

Planning Process Objectives

1. Encourage FDR initiatives to consider a comprehensive review of all reasonable alternatives.
2. Develop a formal evaluation and tracking process for projects seeking RRBB support.
3. Support the inclusion of all damages and benefits in project feasibility evaluations, including traditionally non-quantified damages and natural resource impacts.
4. Encourage project stakeholders to make decisions based on empirical information, rather than personal bias or political pressure.
5. Assure that the implementation of FDR initiatives does not result in a net reduction to local tax base.

Data/Information and Research Objectives

6. Encourage sharing of floodwater management and natural resource data/information, both within and outside the Basin.
7. Support the continuation of the Red River Basin Disaster Information Network, which could serve as a repository for Red River Basin resource data.
8. Encourage uniformity in assessing, reporting and archiving flood damage/recovery statistics between jurisdictions and agencies.
9. Encourage implementation and continuation of FDR research and technical support programs, including funding of a technical resource service to provide technical support to the RRBB and other agencies, organizations and governmental units in the RRB.
10. Advocate agencies to identify areas that are major contributors to flooding in the Red River Basin so FDR efforts can be focused effectively.
11. Encourage the use of standard hydrologic and hydraulic model(s) for all jurisdictions in the Red River Basin.

Coordination and Education Objectives

12. Encourage basin-wide coordinated design and operation of water storage structures.
13. Encourage and support efforts to inform and provide early involvement of FDR project stakeholders.
14. Encourage project proponents to invite policy-making officials to visit FDR project sites. Site visits would allow these officials to observe, first-hand, the issues facing residents of these areas.
15. Educate local governments and residents regarding the public benefits of FDR projects endorsed by the RRBB.

Policies and Programs Objectives

16. Encourage policy and legislative changes to help facilitate development and implementation of FDR projects.
17. Support programs that compensate farmers/landowners for designed water storage.
18. Encourage and support legislative changes that promote and/or reward wise land use and conservation of natural resources by landowners.
19. Encourage policy changes to government and private programs so water can be stored on land set aside for conservation purposes.
20. Promote and support the development of acceptable, uniform FDR minimum design standards for all jurisdictions in the Red River Basin.
21. Encourage changes to policies that prohibit construction of FDR structures (e.g. levees) on floodplain land purchased through FEMA flood-buyout funds.
22. Encourage U.S. Congress to fully fund FDR programs, such as the U.S. Army Corps of Engineers' 14, 205, 206, 208, and 1135 Continuing Authority Programs and Technical Resource Service; Natural Resource Conservation Service's PL566 program; and other state and federal programs such as Conservation Reserve Enhancement Program (CREP).



23. Encourage the Canadian federal and provincial governments to develop proactive programs to assist local governments with planning, designing and constructing flood control projects.
24. Encourage the development of funding mechanism(s) for projects that provide trans-border FDR benefits.

Permitting Objectives

25. Encourage permitting agencies to clearly define policy and permit requirements early in the project development process.
26. Encourage concurrent review of FDR projects by all permitting agencies to expedite the permitting process.
27. Encourage permitting agencies to conduct internal reviews to eliminate unnecessary steps in the permitting process.

GOAL 2: Ensure flood/natural disaster recovery programs meet the needs of all Red River Basin residents.

Objectives:

1. Review the effectiveness and equitable treatment of disaster recovery programs and eligibility requirements.
2. Promote the enhancement of recovery assistance programs that are available to all RRB residents, businesses and agricultural producers regardless of financial status or locality.

DRAINAGE: Inventory Summary

The Drainage Inventory Report provided a historical perspective of drainage, an assessment of drainage today, problem identification and potential solutions and strategies. The objectives of the Report included encouragement of a systematic approach to drainage in the RRB and holistic consideration of all components of the ecosystem in decision making.

GOAL 1: To ensure that management of water resources within the Red River Basin occurs on a hydrologic/watershed basis, rather than a political boundary basis.

Objectives:

1. Support the development of adequate criteria for agricultural drainage throughout the Basin.
2. Support protocols to provide for the cooperative implementation of inter-jurisdictional projects.
3. Encourage joint drainage authorities to aid in the implementation of cross-boundary drainage solutions in areas where there are ongoing disputes.
4. Support and facilitate the establishment of agreements as applicable between Manitoba, Minnesota, North Dakota and South Dakota for dealing with water issues in inter-jurisdictional sub-watersheds.
5. Encourage management of water on a watershed basis.



GOAL 2: To ensure that all proposed drainage systems will incorporate adequate flood protection for downstream land/communities, protection and enhancement of natural resources, and the improvement of agricultural production within the system's entire drainage area.

Objectives:

1. Support the evaluation of downstream impacts on stream flow for proposed drainage projects.
2. Support the installation of temporary storage areas for any proposed drainage project, where appropriate.
3. Support storage areas that mitigate any drainage works within the Basin.
4. Support watershed projects that control runoff and improve water quality within the Basin.
5. Support initiatives that promote land use practices that retain water where it falls on the landscape.

GOAL 3: To ensure that drainage management decisions will be based upon accepted scientific and public information.

Objectives:

1. Support the evaluation and standardized information dissemination of water research projects within the Basin (e.g. evaluate the joint United States Geological Survey and United States Fish and Wildlife Service project on the effects of wetlands on discharge).
2. Support the use of computer generated information to determine where drainage impacts occur.
3. Support the development of an information and education program that enables the public to understand the impacts and benefits of drainage.

WATER QUALITY: Inventory Summary

The objectives of the Water Quality Inventory Report were to: (i) present a tabular summary of ambient water quality criteria in the Basin, as measured by each of four jurisdictions; (ii) assess the environmental conditions influencing water quality in the Basin; (iii) examine, assess and identify gaps in water quality monitoring and assessment activities in the Basin; (iv) identify known water quality impairments in the Basin; and (v) investigate the pollutants and their sources that are causing water quality impairments in the Basin.

The Report reviewed water quality concerns for human health and aquatic ecosystems, discussed the major pollutants and stressors affecting water quality, described relationships between surface water and groundwater quality and quantity, identified the various agencies involved in water quality monitoring and assessment within the RRB and described the results of the USGS National Water Quality Assessment (NAWQA) Report for the Red River Basin Study Unit. Some of the key water quality issues in the RRB include understanding the resource through coordination of water quality standards and monitoring, developing a basin-wide strategy for Best Management Practices to protect water quality and assessment of groundwater quality.



GOAL 1: Coordinate Basin-wide water quality standards and protection efforts for Red River Basin waters.

Objectives:

1. Facilitate coordination of water quality protection efforts of local, state and federal agencies and the International Joint Commission.
2. Support and facilitate the development of mechanisms for basin-wide cooperation (e.g., MN, ND and MB Standard Operating Procedures for field samplers, coordinated water quality network using citizens, local, state and federal governments).
3. Encourage comprehensive community involvement in water quality measurement and assessment by supporting development of citizens programs for monitoring, education and information.
4. Support and encourage research to strengthen and expand assessment tools for understanding water quality.
5. Encourage water development of region-specific water quality standards and goals for the three states and province.

GOAL 2: Ensure that water quality is protected and restored to meet designated beneficial uses of all RRB waters.

Objectives:

1. Support and encourage the enhancement of physical, chemical and biological integrity of RRB waters.
2. Encourage water management agencies to increase the number of miles of assessed streams and acres of lakes and reservoirs to determine compliance with water standards and designated uses.
3. Encourage development of specific pollution reduction targets for impaired waters in the RRB.
4. Encourage and support basin-wide water quality research on an ongoing basis.
5. Facilitate and support coordination of jurisdictional water quality restoration efforts, including both regulatory and non-regulatory water quality programs.

WATER SUPPLY: Inventory Summary

The Water Supply Inventory Team reported information regarding historic, current and future water demands for the entire Red River Basin. The report used 1996 water demand figures, including consumptive and non-consumptive water uses, by jurisdiction to capture a “current” picture of water demand in the RRB. Future population trends were presented to illustrate potential changes in demand up to year 2050. Estimated future water needs in specific communities and potential measures for meeting projected water shortages were included, based on previous work by the Bureau of Reclamation. One of the key issues with regard to water supply in the RRB is data availability – the more informed decision-makers are about surface water levels and groundwater resources, the better they are able to prepare for future floods or water shortages.



GOAL 1: To ensure the long-term sustainability of the Basin's surface water and groundwater for the benefit of all Red River Basin residents today and into the future.

Objectives:

1. Encourage management policies that provide for long-term viability of aquifers and surface water resources.
2. Implement comprehensive, integrated planning and management of water resources to accommodate a balance in resource preservation, conservation and consumption.
3. Encourage all jurisdictions to implement strategies that maintain the quality and diversity of the Basin's waters while acknowledging regional natural variation.
4. Encourage water education and development programs/projects directed toward the reuse, reclamation, conservation and overall wise use of water resources.

GOAL 2: To meet priority uses as determined by the Red River Basin's planning process.

Objectives:

1. Support development and enhancement of municipal and rural water systems required to meet current and projected quantity and quality needs.
2. Encourage development of emergency management plans for water supply contamination and drought preparation, mitigation and assistance.
3. Support water supply development to meet current and projected beneficial uses.
4. Support the evaluation of the quality and quantity of surface and groundwater resources, and provide public inventories of water availability.
5. Explore need, justification and options for providing in-stream flows in major streams.
6. Encourage water supply development projects that recognize long-term sustainable use of available resources.
7. Encourage water management authorities to consider impacts of irrigation, industrial and other water development proposals involving direct or indirect water use on existing and potential water use as well as impacts on the environment.
8. Support improvements to and maintenance of water based recreational opportunities.
9. Identify current and future water supply needs and options to meet economic needs.
10. Support the development of water resources sufficiently to support a broad economic base, while recognizing long-term sustainable use of available resources.
11. Support the development and maintenance of a consistent water supply for domestic, municipal, agricultural, recreational, wildlife and industrial uses that considers impacts on existing and potential water developments, as well as the environment.
12. Support development of water supplies for future irrigation to support growth in the agricultural industry.
13. Support programs and funding to advance technologies that increase the efficiency of agricultural water conveyance systems.
14. Support programs and funding for research to determine how, when and at what rates water can be applied to various soil types and crops to arrive at long-term, cost effective, sustainable use of water.
15. Encourage continued research efforts regarding biota transfer issues.
16. Encourage water supply project sponsors to consider multiple use projects.

CONSERVATION: Inventory Summary

The Conservation Inventory Team defined conservation as “*sustainable development within the Red River Basin through the management and maintenance of resources in order to assure their use by future generations.*” In an attempt to gain an understanding of conservation issues of local significance, many local plans were identified and reviewed. Examples of planning efforts reviewed in the Inventory Report include local, county and state comprehensive water plans, conservation district plans and watershed district plans. Relevant state and provincial materials were also reviewed to identify conservation issues of a broader nature and the administrative focus of each jurisdiction. In reviewing the plans, the objective was to identify conservation issues, problems and conflicts addressed, as well as solutions proposed or actions taken. The inventory revealed that issues of concern in each of the states and province are similar, and typically revolve around soil erosion, water quality, flooding and land use conflicts.



GOAL: Advance a conservation ethic in the Red River Basin to support the delivery of conservation programs for all the land in the Red River Basin.

Objectives:

1. Support the establishment of delivery organizations in places where none exist to provide complete coverage of local units of government such as soil conservation districts, soil and water conservation districts and conservation districts.
2. Promote enhancement of public and private sectors to deliver conservation services.
3. Promote water resources management decisions based on natural rather than political boundaries.
4. Advocate and support additional funding initiatives for established conservation programs.
5. Recognize and encourage “non-program” conservation activities undertaken by landowners.
6. Support the empowerment of local units of government to promote a conservation message.
7. Promote conservation and best management practices through educational outreach programs aimed at Red River Basin residents.
8. Facilitate communications between producers and agencies so programs can be tailored to meet the needs of Basin producers and landowners.
9. Support integrated planning approaches and conservation criteria in resources management projects, whereby potential opportunities and impacts affecting the water-related ecosystem are considered.
10. Support tiered incentives that encourage the use of privately owned marginal lands for water retention, wetlands habitat and carbon sequestration and encourage conversion of developed marginal agricultural lands into natural cover, water retention and wetlands habitat areas.
11. Promote conservation programs which protect prime and/or unique farmland.

FISH, WILDLIFE AND OUTDOOR RECREATION: Inventory Summary

The Fish, Wildlife and Outdoor Recreation Inventory Report included an inventory of land use in the Red River Basin, baseline conditions as they relate to fish and wildlife, a discussion on resource values, future inventory needs and a series of goals, objectives and actions. The goals are listed below and in the RRBC Governing Document. The Inventory Team also attempted to articulate the various issues and challenges facing fish and wildlife resources in the Red River Basin and identified opportunities to increase fish and wildlife resources and improve and expand recreational opportunities.

The Fish, Wildlife and Outdoor Recreation Inventory Team defined a vision for future planning efforts: “Restore and maintain an environment in the Red River Basin that provides for quality human life, prosperous agriculture, flourishing communities, improved water quality, abundant wildlife and healthy habitats, holistic water management, and increased outdoor recreation all of which supports compatible long term economic growth and overall basin environmental health.”



GOAL 1: Support and encourage efforts to provide a diversity of habitats in size, shape and connectivity for stable and diverse fish and wildlife populations to thrive in the long term and provide a host of landscape and societal functions.

GOAL 2: Support conservation, management and restoration of diverse and viable native fish and wildlife populations associated with tallgrass prairie, wetlands, woodlands and riparian habitats.

GOAL 3: Support the enhancement and development of recreational activities, infrastructure and access to the Basin's natural resources while improving the quality of life and growth of a flourishing tourism industry in the RRB.

GOAL 4: Develop and encourage opportunities for environmental education and public awareness in order to foster implementation of holistic management and stewardship of the RRB's fish and wildlife, habitat and water resources.

HYDROLOGY: Inventory Summary

The Hydrology Inventory Team compiled existing hydrologic data for the entire Red River Basin. The Inventory Team reviewed existing documents for pertinent hydrologic and climatological information and attempted to describe the hydrologic cycle of the Red River Basin in terms understandable by the public. The report provided background information on the RRB hydrologic system, conditions that lead to both floods and droughts in the RRB and the status of hydrologic and hydraulic models for the basin. Several barriers to developing basin-wide models were identified and led to the Inventory Team's original development of goals and objectives for Hydrology. Because knowledge of hydrologic and hydraulic processes and models are a critical component of understanding flooding and other water issues in the RRB, the hydrology goals and objectives were incorporated into FDR related goals in the NRFP.

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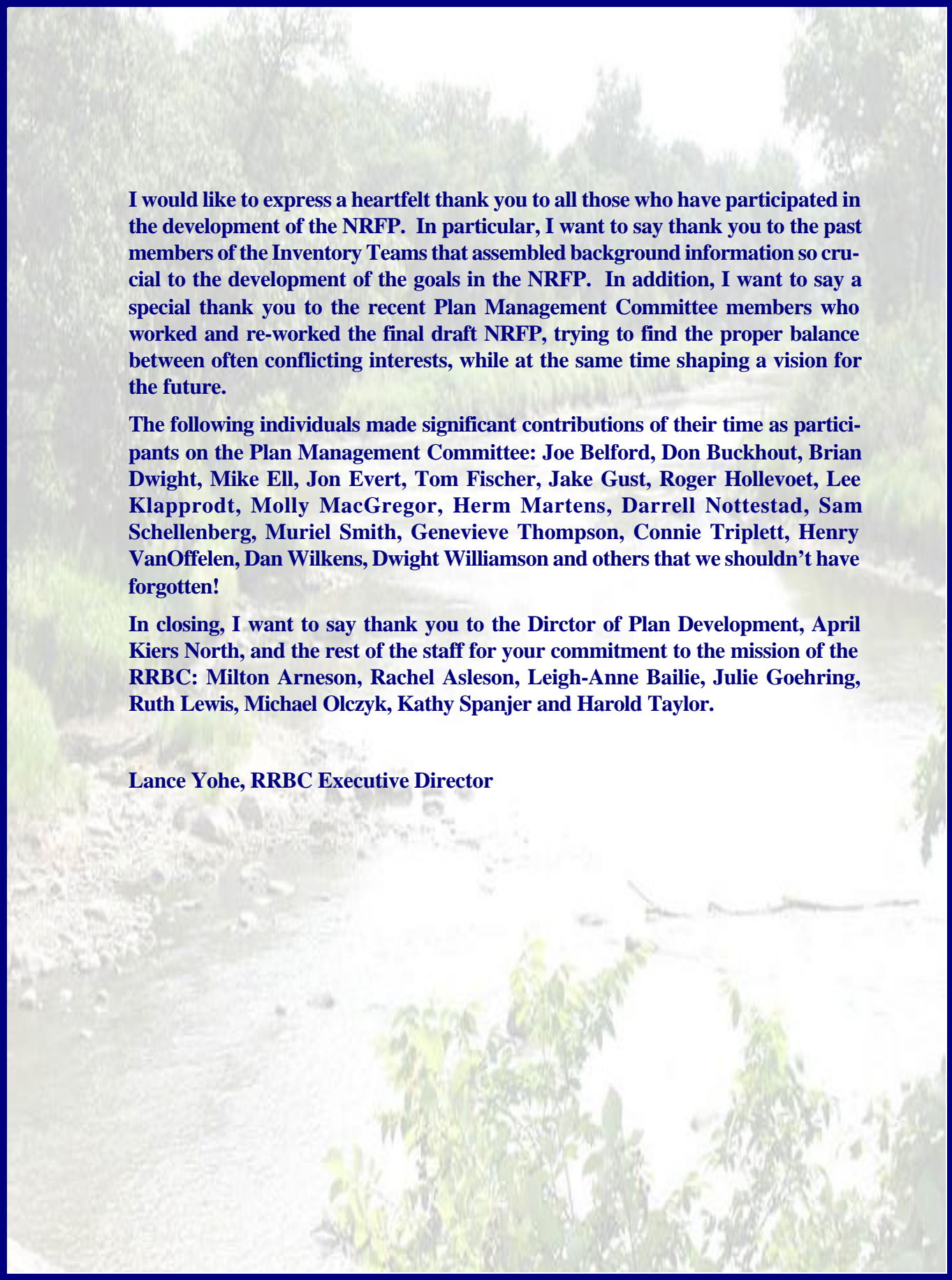
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I would like to express a heartfelt thank you to all those who have participated in the development of the NRFP. In particular, I want to say thank you to the past members of the Inventory Teams that assembled background information so crucial to the development of the goals in the NRFP. In addition, I want to say a special thank you to the recent Plan Management Committee members who worked and re-worked the final draft NRFP, trying to find the proper balance between often conflicting interests, while at the same time shaping a vision for the future.

The following individuals made significant contributions of their time as participants on the Plan Management Committee: Joe Belford, Don Buckhout, Brian Dwight, Mike Ell, Jon Evert, Tom Fischer, Jake Gust, Roger Hollevoet, Lee Klapprodt, Molly MacGregor, Herm Martens, Darrell Nottestad, Sam Schellenberg, Muriel Smith, Genevieve Thompson, Connie Triplett, Henry VanOffelen, Dan Wilkens, Dwight Williamson and others that we shouldn't have forgotten!

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