Study of Riparian Buffer Areas

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Minnesota Legislature Directive

Session Laws of 2009, Chapter 88 – H.F.No. 1298, Article 2, Property Taxes

Sec. 51. **STUDY OF RIPARIAN BUFFER AREAS.**

The drainage working group, facilitated by the Board of Water and Soil Resources, must study the condition of riparian buffer areas across the state, and report on the extent to which the buffer areas are being maintained in a natural state, and the extent to which the buffer areas are being used in a way that risks environmental damage to public waters. The working group must make a report to the chairs and ranking minority members of the house of representatives and senate tax committees by March 1, 2010, on the condition of buffer areas, along with recommendations, if deemed necessary, for policy options such as tax incentives and any other types of incentives that might be necessary to promote the preservation of buffer areas.

EFFECTIVE DATE. This section is effective the day following final enactment.

Stakeholder Drainage Work Group

The Drainage Work Group (DWG) is an informal group of drainage stakeholders facilitated by the Board of Water and Soil Resources (BWSR), with the following primary purposes:

- foster science-based mutual understandings regarding drainage topics and issues;
- develop consensus recommendations for drainage system management and related water management, including recommendations for updating Chapter 103E drainage law and other provisions.

Members of the DWG serve voluntarily. Since drainage stakeholders began meeting as the Drainage Work Group in 2006, meetings have been held approximately 5 to 7 times per year. Staff support for the DWG is limited to the facilitation, coordination, and associated research and document development provided by the BWSR. Drainage Work Group members and invited presenters provide information about topics of discussion.

Study Advisory Committee

The DWG established a subgroup to serve as an advisory committee for this study. Following are the DWG members of this advisory committee and their affiliation.

Wayne Anderson, Engineer, Minnesota Pollution Control Agency
Craig Austinson, Drainage Manager, Blue Earth County
Ray Bohn, Lobbyist, Minnesota Association of Watershed Districts
Greg Eggers, Drainage Engineer, Minnesota Department of Natural Resources
Henry Erdman, Minnesota Seasonal Recreational Property Owners Coalition
Jeff Forester, Exec. Dir., Minnesota Seasonal Recreational Property Owners Coalition
Annalee Garletz, E&NR Policy Analyst, Association of Minnesota Counties
Rick Moore, GIS Specialist, MN State University, Mankato, Water Resources Center
Henry VanOffelen, Natural Resource Scientist, MN Center for Environmental Advocacy

Two additional people were invited and served on or otherwise assisted the advisory committee, because of their areas of expertise:

Professor Steve Taff, Department of Applied Economics, University of Minnesota
Paul Senne, GIS Specialist, Minnesota Board of Water and Soil Resources

Key Definitions

Riparian: Of, pertaining to, or located on or adjacent to the bank of a watercourse or other water body.

Riparian Buffer Area: An area along and adjacent to a water body that buffers the effects of adjacent land use on the water body. This typically involves a setback of a particular land use and can involve trapping of sediment, nutrients and/or bacteria, as well as terrestrial and aquatic habitat protection or improvement.

Filter Strip: A strip of perennial vegetation with sheet flow of surface runoff across the strip, and/or near-surface groundwater flow beneath the strip, to filter sediment, nutrients and/or bacteria from the surface runoff and/or near-surface groundwater. Sheet flow across a filter strip generally requires a relatively uniform controlling elevation and slope of the filter strip from the adjacent land use to the water body to avoid concentrated flow.

Information Sources Regarding Condition of Riparian Buffer Areas

The study advisory committee members and others were consulted to identify pertinent literature and Geographic Information System (GIS) data layers. GIS specialists at state agencies and Minnesota State University, Mankato were consulted to identify available GIS information layers. These investigations identified a scarcity of existing information sources to enable an evaluation of the condition of riparian areas in Minnesota. The following pertinent studies and information were identified.

Public Drainage Ditch Buffer Study, February 2006

One of the outcomes of this study was an estimate of the miles and percent of Minnesota Statutes Chapter 103E public drainage ditches in Minnesota with adjacent Section 103E.021 buffer strips, conservation buffer lands, or other “natural” perennial vegetation buffers along public drainage ditches, including forestland, wetland, grassland and shrubland. The available data sources for this analysis included:

- DNR Surface Hydrology, Channelized Streams and Ditches, GIS data layer
- 13-County South Central Minnesota GIS public drainage ditch data layer compiled by the Minnesota State University, Mankato, Water Resources Center, circa 1993
- Farm Services Agency GIS shapefile data layer of CRP lands involving CP-21 (Filter Strip) and CP-22 (Forest Riparian Buffer) practices, November 2005
- BWSR RIM and CREP conservation easement shapefile data layer, May 2004
- USGS Natural Land Cover Dataset, 1992
- International Coalition Land Use/Land Cover Dataset, 1989

This GIS analysis using available data layers indicated the following buffered miles of public drainage ditch statewide.

Table 1. Public Drainage Ditch Buffer Study 2006 – Buffered Miles Estimates

Category of Buffer	Buffered Miles of Public Drainage Ditches[3]	% of Total Public Drainage Ditch GIS Miles (21,400)[3]
Section 103.021 Buffers In Place[1]	1,561	7%
Conservation Program Buffers[2]	1,787	8%
"Natural" Buffers	9,724	45%
Total	11,511	60%

[1] This buffer strip requirement is triggered by proceedings that appoint viewers to determine benefits and damages, including establishment, improvement, redetermination of benefits and damages, or certain repairs that require additional ditch right-of-way.

[2] Reinvest in Minnesota Reserve (RIM), federal Conservation Reserve Program (CRP), and federal-state Conservation Reserve Enhancement Program (CREP).

[3] Includes drainage ditch miles with buffer on one side or both sides of the ditch. Note that drainage ditches in very flat topography are often along roads, precluding the opportunity for a vegetated buffer on both sides of the ditch.

The total buffered public drainage ditch miles per county ranged from 15% to 95%, with the lowest percentages generally in highly agricultural counties and the highest percentages in counties with high amounts of forestlands, wetlands, pastureland, hayland and/or low total miles of public drainage ditch.

Figure 1. Drainage Ditch with Grass Buffer Strip
(Note that ditch spoil placement with slope away from the ditch precludes this buffer strip from serving as filter strip for field runoff.)

Figure 2. Ditch with Forested Buffer Adjacent to Road

Figure 3. Drainage Ditch in Need of Buffer Strip for Tillage Setback

BWSR Cultivated Riparian Zone Estimates (2009)

Purpose: GIS analyses to estimate cultivated cropland within 50-ft. riparian zones adjacent to state surface waters in counties with greater than 30% cropland.

Separate Estimates:

1) For all rivers, streams, lakes and National Wetland Inventory open water wetlands (i.e. all surface waters), in counties with greater than 30% cropland (67 counties).
2) For all Minnesota Public Waters Inventory watercourses and basins in counties with greater than 30% cropland (67 counties).

Data Sources:

Estimate 1):

- DNR 24K (i.e. 1:24,000 scale) Rivers and Streams data layer, including channelized streams and drainage ditches
- DNR 24K Lakes data layer
- USFWS National Wetland Inventory (NWI) (types 3, 4 and 5 greater than 10 acres)

Estimate 2):

- DNR Public Waters Inventory (PWI) Watercourses
- DNR Public Waters Inventory (PWI) Basins

Estimates 1) and 2):

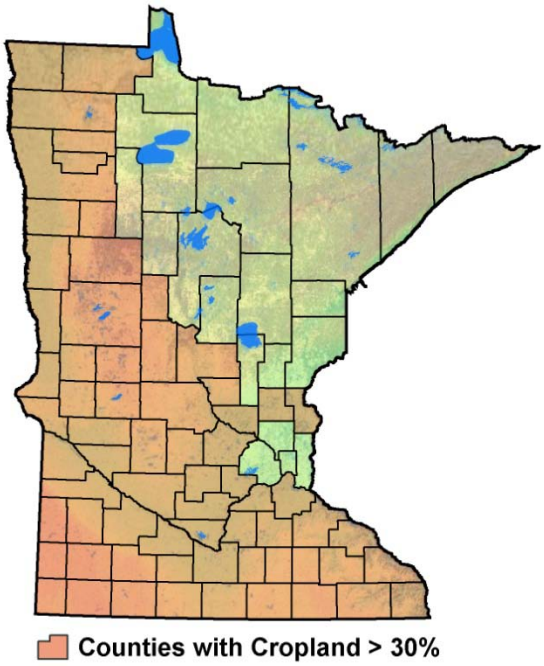

Figure 4. Counties with >30% Cropland

- USDA – National Agricultural Statistics Service (NASS) 2008 Cropland Data Layer (CDL) (satellite raster imagery with 56-meter by 56-meter resolution)
- BWSR Conservation Lands Summary Statewide (includes USDA Farm Service Agency 2001 cropland areas used to define counties with greater than 30% cropland)

Data Evaluation Methods:

- The vector and raster data sources identified above were integrated and evaluated via GIS, including interpolation of large Cropland Data Layer pixels along water and cropland interfaces to better represent the land use within the 50-ft. riparian zone.

Products:

- Tables estimating acres, miles and percent cultivated land within 50-ft. riparian zones of 1) all surface waters and 2) all public waters, for counties with greater than 30% cropland. An example partial table of estimated cultivated acres within 50-ft. riparian zones along public waters is shown below. The project write-up and full tables are available via the following link: http://www.bwsr.state.mn.us/easements/Cultivated_Riparian_Zone_Analysis.pdf

Counties with More than 30% Cultivated Land
Cultivated Acres within 50 Ft Riparian Zone Adjacent to All Public Waters
Reporting Rivers, Streams, Lakes and Wetlands *

Table 3.

		Riparian and Cultivated Riparian Acres Adjacent to Public Surface Waters					
		All Public Surface Waters			Perennial Public Surface Waters		
County Name	Total Acres	Riparian Acres	Cultivated Riparian Acres	Cultivated Percent	Riparian Acres	Cultivated Riparian Acres	Cultivated Percent
Becker	925,073	17,597	1,436	8%	16,407	1,154	7%
Benton	264,221	3,107	189	6%	2,235	86	4%
Big Stone	338,286	5,850	2,952	50%	4,098	1,811	44%
Blue Earth	489,731	8,510	2,801	33%	6,728	1,741	26%
Brown	395,607	5,397	1,891	35%	3,916	987	25%
Carver	240,450	5,432	765	14%	4,271	410	10%
Chippewa	376,406	5,474	2,894	53%	2,724	965	35%
Chisago	283,030	5,474	161	3%	4,273	61	1%
Clay	674,378	7,415	2,202	30%	5,592	1,480	26%
Cottonwood	415,044	6,698	2,746	41%	4,072	1,323	32%
Dakota	374,981	5,392	405	8%	4,156	166	4%
Dodge	281,164	3,066	685	22%	2,220	274	12%
Douglas	460,946	9,428	1,042	11%	8,194	854	10%
Faribault	461,631	7,072	3,637	51%	5,915	2,755	47%

Figure 5. Example Partial Table of BWSR Cultivated Riparian Zone Estimates 2009

Limitations:

- 2008 Cropland Data Layer resolution (56 meters = 184 feet) is much coarser than the width (50 feet) of the riparian zones evaluated, which creates a significant potential that the actual land use in the riparian zone could be misrepresented. It is generally undesirable to use data sets with substantially differing scales. However, the Cropland Data Layer is the best current cropland data layer available.
- Spatial definition of water features is limited by the resolution and accuracy of the associated data layers.

Cannon River Watershed Partnership (CRWP) Shoreland Mapping Project (2008 – 2010)
Purpose: Develop GIS maps of land cover/use within shoreland of public watercourses in a 10-county area of southeast Minnesota to assist in land use decisions affecting surface water quality.

Data Sources and Land Cover Classification System:

- DNR Public Waters Inventory (PWI) Watercourses
- 2008 USDA Farm Services Agency (FSA) National Agricultural Imagery Program (NAIP) aerial photos with 1-meter resolution.
- Minnesota Land Cover Classification System (MLCCS) (generally at Level 3, but not field verified)

Data Evaluation Methods:

- Public watercourse alignments and land cover type boundaries within 300-ft. shoreland zones on each side of the watercourse are hand digitized from 2008 NAIP aerial photos at a scale of 1 inch = 400 feet.

Products:

- ArcView GIS files for 10 southeast Minnesota counties defining land cover shapefiles with MLCCS classifications within 300 feet of public watercourses. Five counties are complete at this time, including Mower, Rice, Goodhue, Wabasha and Winona. Counties to be completed by mid 2010 include Steele, Dodge, Olmsted, Fillmore and Houston. As these maps are developed, the information is made available on the CRWP web site (http://crwp.net/data_notice.html) and incorporated into the statewide MLCCS dataset on the MDNR data deli. A status map of MLCCS data statewide is at: http://files.dnr.state.mn.us/assistance/nrplanning/community/mlccs/mlccs_statewide_status.pdf

Example MLCCS Codes:
24000 = Cultivated herbaceous vegetation
32000 = Deciduous forest
42000 = Deciduous woodland
61000 = Grassland or emergent vegetation
62000 = Grassland with sparse tree layer

Figure 6. Example CRWP Shoreland Mapping Product

Limitations:

- This project involves hand digitization of river and stream alignments and land cover boundaries within 300-ft. shoreland zones of public watercourses, at a scale of 1” = 400’. Although the methodology used does not include field verification, it is expected to be substantially reliable.

Costs:

- These maps are estimated to cost on average approximately $4,000 per county for staff time on a part-time basis through the CRWP.

Table 2. Comparison of BWSR Cultivated Riparian Zone Estimates and CRWP Shoreland Mapping Project Data

County	BWSR Cultivated Riparian Zone Estimate 2 (Cultivated acres within 50 feet of Public Waters)	CRWP Shoreland Mapping Project (Cultivated acres within 50 feet of Public Waters)
Goodhue	885	276
Mower	952	238
Rice	769	414
Winona	116	154
Wabasha	210	64

Summary of Information Regarding Condition of Riparian Buffer Areas

***Public Drainage Ditch Buffer Study* (2006)**

- Perennial vegetation buffer strips and/or conservation program lands were estimated to exist along approximately 15% of public drainage ditches in 2006.
- “Natural” perennial vegetation buffers are estimated to exist along approximately 45% of public drainage ditches, primarily in areas with high amounts of forestlands, wetlands, pastureland, hayland and/or low total miles of public drainage ditch.

BWSR Cultivated Riparian Zone Estimates (2009)

- Within the 67 Minnesota counties with greater than 30% cropland, these estimates indicated that between a few % and 60% of land within 50-ft. riparian zones of all public waters (watercourses, lakes and wetlands) are cultivated. However, the raster cropland data layer used for these estimates has a resolution (i.e. pixel size) of 184 ft. by 184 ft., which is substantially greater than the 50-ft. riparian zone evaluated, which limited the accuracy of the estimates. Comparison of these estimates with data from the Cannon River Watershed Partnership Shoreland Mapping Project, which used a more reliable land cover definition method (albeit quite labor intensive and without field verification), indicates that the BWSR 50-ft. riparian zone estimates do not appear to be reliable.

Cannon River Watershed Partnership Shoreland Mapping Project (2008 – 2010)

- This project is using 2008 aerial photos at a scale of 1 inch = 400 ft. to hand digitize land cover within 300 ft. of public watercourses. While this method is labor-intensive, the results are expected to be substantially reliable.
- In the 5 southeast Minnesota counties mapped to date along public watercourses (Rice, Goodhue, Wabasha, Mower and Winona Counties), the amount of cropland within 50-ft. riparian zones for public watercourses is estimated range from about 60 acres to 400 acres per county.

Information searches and discussions with GIS specialists indicate that data layers currently are not available to enable a reliable statewide evaluation of land cover and use within riparian areas along public waters. To date, the Minnesota Land Cover Classification System has been used for a small percentage of the state, including most of the 7-county Metro area, one outstate county (Olmsted), and scattered smaller areas statewide. A status map of MLCCS data statewide is at: http://files.dnr.state.mn.us/assistance/nrplanning/community/mlccs/mlccs_statewide_status.pdf. This includes the CRWP Shoreland Mapping Project along public watercourses in 5 southeast Minnesota counties to date. Land cover data is not available to readily conduct a statewide evaluation of the environmental risk of current riparian zone land use on public waters.

It should also be noted that definition of riparian zone land use that constitutes an environmental risk to public waters is complex. The risks associated with cultivated land use within riparian zones vary based on topography, soils, tillage methods, nutrient management, grazing management, pest management, weed management, erosion control practices and other conservation practices.

Information Search Regarding Incentives for Riparian Buffers

The focus of this information search was on incentives for preservation of riparian buffer areas. However, the following summary includes information regarding incentives for both establishment and preservation of riparian buffer areas. Literature search assistance provided by Jeff Forester, MSRPO, is gratefully acknowledged.

Summaries of Riparian Buffer Programs in Other States

Arkansas – Private Wetland and Riparian Zone Creation, Restoration and Conservation Tax Credit Program

- Two types of tax credits: 1) Wetland and riparian zone creation and restoration tax credit (since 1996) for project costs incurred in the creation or restoration of wetlands and riparian zones; and 2) Wetland and riparian zone conservation tax credit (starting January 1, 2009) for up to 50% of the fair market value of the qualified real property interest donation calculated to exclude any short term capital gain under 26 U.S.C.§170(e)(1)(A).
- Both tax credits apply to Arkansas Income Tax, up to $50,000 per project at up to $5,000 per year, not to exceed the amount of individual or corporate income tax otherwise due for the taxable year.

- Administered by the Arkansas Natural Resources Commission, in consultation with a committee involving the Arkansas Forestry Commission, Arkansas State Game and Fish Commission, Department of Finance and Administration, Department of Arkansas Heritage, Department of Environmental Quality and two public members with expertise in wetlands and riparian zone ecology.
- Real property interest donations from eligible donors to eligible donees must be recorded.
- Riparian zone minimum width of 35 feet.
- Project design standards apply and projects must be complete and functioning in 3 years and maintained for a minimum of 10 years after certification of completion.
- Enrollment fee of 3% of approved tax credit (minimum $100).
- Maximum total tax credits available statewide is $500,000 per year, which limits enrollment approvals.

Burnett County, Wisconsin – Shoreline Incentive Program

- Program objective is to encourage restoration and protection of a natural shoreline buffer (minimum 35 feet wide/deep, with 30-foot wide access and viewing corridor).
- Includes requirement for a restrictive covenant / deed restriction.
- Incentives provided include: enrollment payment of $250; annual credit of $50 delivered via property tax; free visit by a natural landscape expert; planting plans to restore a natural shoreline; payments that cover 70% of plants and materials; exclusive shirt or cap for Shoreline Incentives Program; optional sign to post at the water's edge.
- Began in 2000 with a $250,000 Lake Protection Grant from the WDNR. The county has received subsequent state Lake Protection Grants to enhance the program, including additional BMPs and Community Based Social Marketing. Future funding unclear.
- Over 600 parcels have enrolled.

Maryland – Buffer Incentive Program

- Purpose is to establish and maintain streamside forested buffers around the Chesapeake Bay and its tributaries.
- Administered by Maryland DNR Forest Service.
- One-time incentive payment on acres planted to forested buffers at $300 per acre upon verification of 65% seedling survival rate after 1 year. A reduced payment of 50% is payable for a survival rate of 50% to 65%. Maximum payment $15,000.
- Property must meet one of the following three criteria: 1) be within 300 ft. of a stream, river, pond or non-tidal wetland; or 2) be with 300 ft. plus 4 ft. for every 1% slope for slopes averaging greater than 6%; or 3) be within the 100-year floodplain.
- Private landowner must have 1 to 50 acres which is cropland, pastureland, or open or bare ground with early successional vegetation.

Oklahoma – Buffer Strip Property Tax Valuation

- Tax policy added circa 1988. (O.C. Title 68, Chapter 1, Article 28, Section 2817)
- Eligible landowners must be participating in a state or federal conservation cost-share program.
- Eligible land must comply with USDA-NRCS buffer strip standards and specifications.
- Eligible buffer strip practices include: Alley Cropping, Filter Strip, Field Border, Contour Buffer Strip, Grassed Waterway, Riparian Forest Buffer, or Riparian Herbaceous Cover.
- Buffer strips must be valued for property tax separate parcels of property.
- Property valuation and assessment based on highest and best use, but buffer strip use value based only on income from production agriculture from buffer strips.

Oregon – Riparian Lands Tax Incentive Program

- Program intent is to provide landowners with tax incentives to protect, conserve or restore healthy riparian habitat on private lands adjacent to perennial and intermittent streams for long-term streambank stability, erosion control, water quality, large wood recruitment, fish and wildlife habitat protection, conservation or restoration, and other functions deemed important to healthy aquatic habitats.
- Eligible lands are private and riparian to perennial or intermittent streams, outside adopted urban growth boundaries (with some exception), zoned as agricultural or forestland, with non-aquatic vegetation.
- Program established in 1981.
- Buffer areas up to 100-ft. wide, with a maximum of 25 acres per mile of stream.
- Maximum of 200 miles per county.
- Buffer areas are required to have an approved riparian management plan and Riparian Tax Incentive Program Agreement.
- Applicants are encouraged to seek technical assistance with developing the riparian management plan and implementing management practices from the local offices of the Oregon Department of Fish and Wildlife or the Soil and Water Conservation District.
- Administration, inspection and enforcement by the Oregon Dept. of Fish and Wildlife.
- Program lands receive exemption from ad valorum taxation.
- Withdrawal penalty up to the total tax exemption for the current landowner or 5 years back taxes, whichever is less.

Virginia – Wetland and Riparian Buffers and Shoreline Erosion Control Tax Credits

- Program enacted in 1998 allowing counties and municipalities to grant property tax incentives to encourage landowners to protect wetlands and riparian buffers and to install shoreline erosion control structures for water quality improvement.
- Wetlands and riparian buffers subject to a perpetual easement permitting inundation by water are defined as a separate class of property for local taxation.
- Property tax exemption or partial exemption runs with the property not to exceed 15 yrs.

- Shoreline erosion control tax incentive is based on increase in assessed value of the property or 50% of the cost of the improvements.
- Local governments can apply for competitive reimbursement through the Virginia Water Quality Improvement Fund (which appears to be primarily state general funds).

Virginia – Riparian Forest Buffer Tax Credit

- Program enacted in 2000 provides a tax incentive to landowners to leave a riparian forest buffer strip from 35ft. up to 300 ft. wide for 15 years along a perennial or intermittent stream when conducting adjacent timber-harvesting operations.
- Income tax credit is 25% of the value of the timber retained, up to $17,500, with amount in excess of annual tax liability carrying forward for up to five years.
- Applicant must have a Forest Stewardship Plan.
- Any water quality site problems must be corrected before the landowner qualifies.
- Application fee of $150.

Recent or Ongoing Studies in Minnesota Addressing Riparian Buffer Incentives

Minnesota Statewide Conservation and Preservation Plan (2008) – UMN et al.

- Funded by LCCMR.
- Identifies and recommends a suite of policy and incentive options for conservation and preservation, including fee title acquisition, conservation easements, voluntary BMPs with technical and financial assistance, conservation tax credits (income, property, deed and/or inheritance tax) for riparian buffers and other restoration and protection practices, and trading of tax credits.
- Acknowledges that conservation on private lands is critical for statewide conservation and preservation.

Pilot Native Shoreland Buffer Incentives Program – DNR, UMN WRC

- Pilot program funded by LCCMR $150,000 grant in 2008.
- Purpose is to investigate barriers to restoring and/or maintaining native vegetation buffers along shorelands of lakes, rivers and streams, including testing two pilot local incentive programs.
- East Otter Tail SWCD and Itasca County projects selected and ongoing.
- Pre-project surveys/tests of knowledge, attitudes and practices complete.
- East Otter Tail SWCD project involves cost-share and technical assistance, while Itasca County project involves peer to peer interaction and technical assistance.
- Post-project surveys/tests of knowledge, attitudes and practices to planned for late 2010 or early 2011.

Summary of Key Programs Involving Riparian Buffers in Minnesota

Conservation Reserve Program (CRP) – Farm Services Agency (FSA)

- This major federal conservation program includes riparian grass buffer strips, filter strips and riparian forested buffer strip practices.
- Minimum buffer width for filter strip of 30 feet and maximum up to 240 feet, depending on filter strip objectives and land slope.
- Riparian forest buffer strip minimum width 35 feet, maximum width up to 600 feet or to the width of the 100-yr. floodplain, whichever is less, depending on habitat objectives.
- Involves 10 or 15 year contracts with annual rental payments, up to 50% cost-share for approved conservation practices, and other maintenance and incentive payments.

Reinvest in Minnesota Reserve Program (RIM) – BWSR

- The RIM Reserve program and associated state-federal partnership programs with CRP and WRP have acquired temporary and perpetual conservation easements on substantial amounts of sensitive land in Minnesota, including much riparian land, creating perennial vegetation buffers along many miles of public waters.
- The partnership Conservation Reserve Enhancement Programs (CREP 1 and CREP 2) in Minnesota also included much riparian buffer lands.
- The RIM-WRP partnership program acquires perpetual conservation easements and associated riparian buffer lands associated with wetland restorations on agricultural lands.
- Maximum upland to wetland ratio of 4 to 1, with limits on land without a crop history.
- Involves payment for conservation easements, as well as for conservation practices.

Wetland Reserve Program (WRP) – Natural Resources Conservation Service (NRCS)

- Federal wetland restoration program with 30-yr. and perpetual conservation easements.
- Enrolled lands for wetland restoration include riparian buffer lands.
- Current maximum upland to wetland ratio of 4 to 1.
- Involves payment for conservation easements, as well as for conservation practices.

The CRP, RIM and WRP programs focus on agricultural lands, including riparian lands. The majority of enrolled lands are located in three of Minnesota's four ecological provinces (i.e. Tallgrass Prairie Parkland, Prairie Parkland and Eastern Broadleaf Forest), which include the majority of the agricultural lands in Minnesota. The Laurentian Mixed Forest ecological province in north central and northeast Minnesota has a limited amount of land enrolled in these programs. Figure 7 shows the locations of RIM, CRP, CREP and WRP conservation lands that are riparian to Minnesota public water rivers, streams and lakes, using currently available program data and public waters GIS data layers.

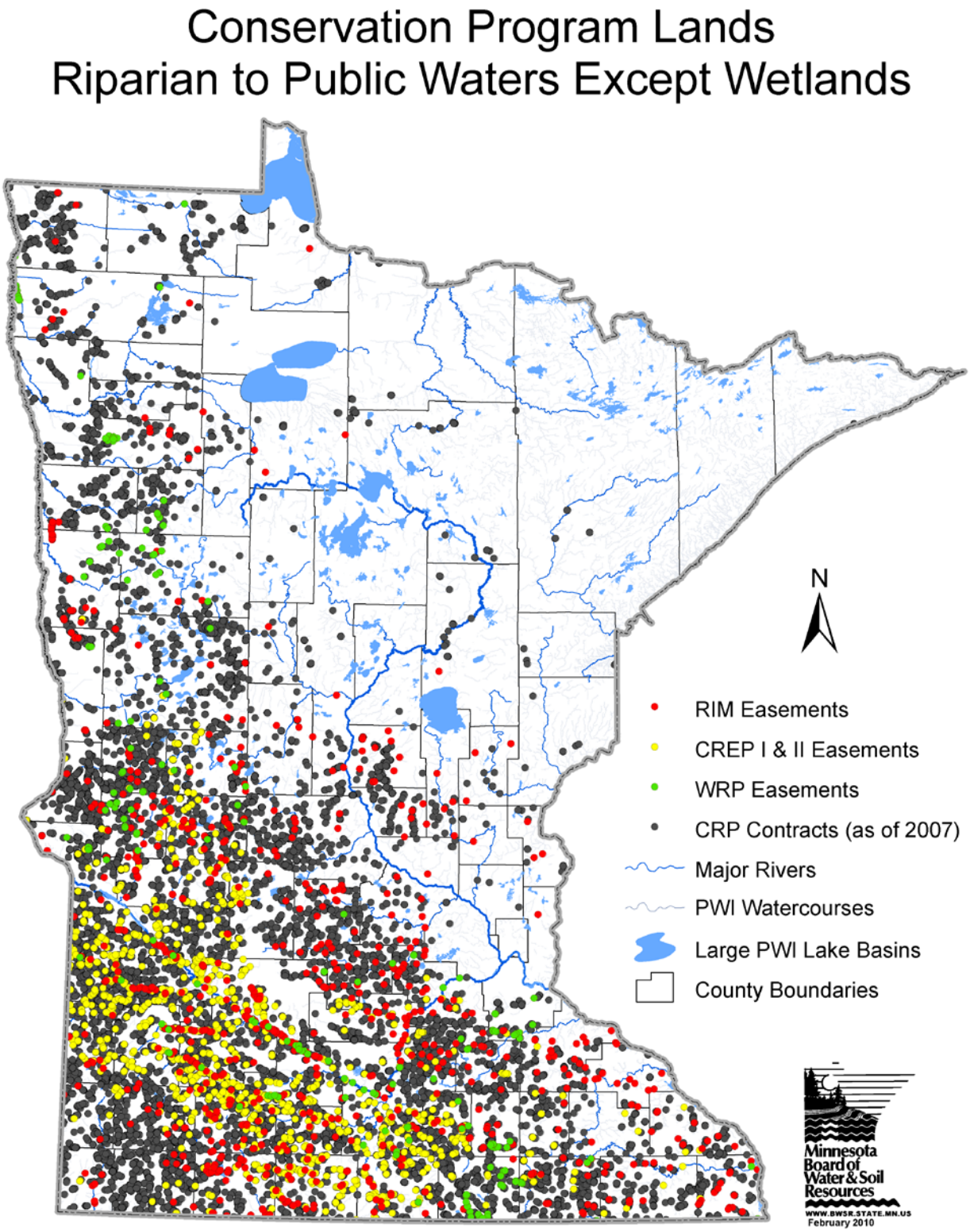

Figure 7. Conservation Lands Riparian to Public Waters Except Wetlands, for RIM, CRP, CREP, WRP – February 2010

Environmental Quality Incentives Program (EQIP) – NRCS

- Provides cost-share and/or incentive payments and associated technical assistance for a variety of conservation practices on private agricultural lands, including filter strips, forest riparian buffers, critical area plantings, and other riparian practices.
- Payment rates are set for different practices.
- Contract agreements required with lengths depending on practices implemented.
- Technical assistance via NRCS, SWCDs and private Technical Service Providers.

Native Buffer Cost-Share Program – BWSR

- First allocation of state cost-share appropriation to BWSR for this purpose by the Minnesota Legislature was in FY 2008 ($1.2M / yr.)
- FY 2008 program development and allocation of funds to 74 Soil and Water Conservation Districts (SWCDs) to promote statewide marketing and implementation.
- FY 2009 and FY 2010 competitive grant process to SWCDs.
- FY 2009 – Grant funding available: $1.2M; Grant requests: $1M (44 projects)
- FY 2010 – Grant funding available: $1M; Grant requests: $1.45M
- 15-yr. cost-share contracts.
- Cost-share rate up to 75%.
- Number of projects reported in eLINK to date: 148

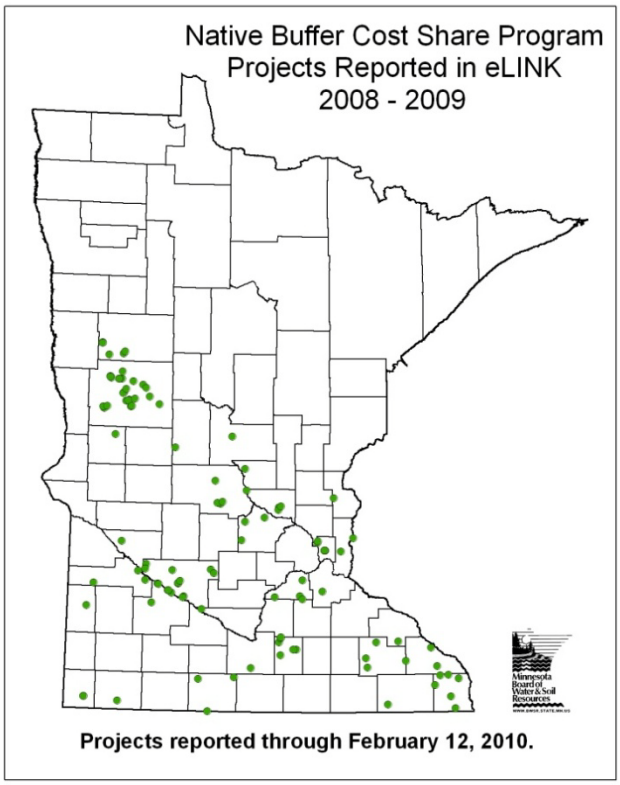

Figure 8. Native Buffer Cost-Share Project Locations to Date

Clean Water Fund, RIM Riparian Buffer Conservation Easement Program – BWSR

- First appropriation by the Minnesota Legislature for this new program was for FY 2010, which is being implemented in partnership with Soil and Water Conservation Districts.
- Annual appropriation for FY 2010 and FY 2011: $3.25M / yr.
- For native vegetation buffers adjacent to public waters (streams, rivers, ditches, lakes) excluding wetlands.
- Buffer widths: minimum 50 ft. and no more than 100 ft. average.
- Permanent easements required.
- Initial priority is on land in CRP contracts.

Literature Search Regarding Effectiveness of Incentives for Conservation Including Riparian Buffers

Literature search assistance and associated discussion provided by Professor Steve Taff, UMN, Jeff Forester, MSRPO, Professor Earl Grinols, Baylor University, and Erika Rivers, DNR, is gratefully acknowledged.

Griswold, Jerry R.; "Conservation Credit: Motivating Landowners to Implement Soil Conservation Practices Through Property Tax Credit"; Journal of Soil and Water Conservation 42(1), January/February 1987.

- Five-year study initiated in 1984 in three townships in Pepin County, Wisconsin. Landowners were eligible for a property tax credit ($3.00/acre) for implementing and maintaining conservation practices to reduce soil erosion below the tolerable level (T).
- Participating landowners typically selected management-oriented practices that could be implemented at relatively low cost, including crop rotation change, conservation tillage, contour farming, and contour strip cropping.
- Cropland acres protected increased by about 70% (range from 50% to 85%) in the treatment townships, compared to an increase of less than 5% in control townships.
- Tax credits were approximately $75,000 per year total for the three treatment townships.
- Technical assistance costs were about $55,000 concentrated in the first two years for planning and installation, with smaller portions in years 3 – 5 for spot checks.
- Administrative assistance costs at that time were about $12,000 total for the Pepin County Land Conservation Department and townships.

Lynch, Lori and Brown, Cheryl; "Landowner Decision-Making About Riparian Buffers"; Journal of Agriculture and Applied Economics, 32(3):585-596, 2000.

- This paper examined how agricultural landowners in Maryland were likely to respond to a Maryland Conservation Reserve Enhancement Program (CREP).
- Based on experience from the Maryland Buffer Incentive Program, it was found that longer-term conservation practices needed higher rental payments.
- CREP participation was expected to be significantly dependent on land development potential, crop prices (opportunity costs) and payment rates.
- Expect lower participation in counties with high land values or low soil rental rates.

Klapproth, Julia C. and Johnson, James E.; "Understanding the Science Behind Riparian Forest Buffers: Factors Influencing Adoption"; Virginia Cooperative Extension, Virginia Tech University, February 2001

- A majority of farmers surveyed in Virginia and Iowa in the 1980s indicated that they participated in conservation programs because they have a high priority on preventing soil erosion and improving water quality.
- Many farmers believe that they should be free to manage their land as they wish, although they should not be free to abuse the land.
- Economics is a high priority factor for full-time farmers with no other source of income. Practices that are profitable, simple to implement, and compatible with existing machinery and operations are more likely to be implemented.

- Renters are less likely to benefit directly from conservation program incentives.
- A landowner's perception of a problem at the farm/home level is one of the most important factors affecting adoption of conservation practices. Successful riparian restoration and protection programs educate landowners about the exact nature of the problem, demonstrate benefit to the local environment, illustrate the role the individual plays in the process, and provide effective, workable solutions.
- Technical assistance can be particularly important when programs and practices are first introduced and when conservation practices are complex or unfamiliar.
- Funding should be targeted where it is most effective for conservation, in order to enable more marketable compensation to participating landowners.
- Tax incentives for reforestation and riparian forest buffer preservation via reduction of state or federal income taxes or local property tax have been substantially marketable in a number of states and regions.
- Economic disincentives have been used primarily to control point sources of pollution.
- Regulation for water quality protection has had increasing public support. However, a regulatory approach to nonpoint source pollution does not necessarily result in the greatest improvement to water quality and can be expensive to implement and monitor.

Kauneckis, Derek; "What Do We Know About Landowner Behavior and Why Does it Matter for Environmental Policy Design"; presented at Western Political Science Association meeting, March 8-10, 2007, Las Vegas, Nevada

- Economic incentives alone often do not explain private lands conservation program participation.
- Landowner perceptions about the overall goals of a program and the efficacy of the program in relationship to the underlying problem, as well as trust in the program marketers and effective follow-up, can be significant factors affecting participation.
- Opportunity costs (the value of other choices that one gives up when making a decision) typically are a significant factor affecting conservation program participation by agricultural producers and other private landowners. These can vary substantially by location and land use potential.
- Monetary incentives alone are often too small to fundamentally change land use decisions and may only reward a landowner for activity he or she was likely to do without a small monetary incentive.
- The literature acknowledges that land use decisions are complex, often involving multiple overlapping motives and perceptions by individual decision-makers.

Qui, Z.; Hall, C.; Hale, K.; "Evaluation of Cost-Effectiveness of Conservation Buffer Placement Strategies in a River Basin"; Journal of Soil and Water Conservation, Vol. 64, No. 5, September/October 2009

- A variable source area (VSA) buffer placement strategy was found to be more cost-effective than fixed-width or variable-width riparian buffer strategies in New Jersey. The VSA buffer strategy uses a wetness index derived through terrain analysis of digital elevation models (DEMs), together with land use, soil and stream data to develop a topographic index to identify critical source areas for buffer placement and design.
- Buffers should also be applied in upland areas to prevent runoff from forming concentrated flow into riparian areas.

Grinols, Earl L.; "Saving Minnesota's Recreational Lands for Public Enjoyment"; Department of Economics, Baylor University, January 2007, and personal communication February 2010

- The current property tax system in Minnesota and elsewhere defines the value and tax capacity of properties based on the highest and best use and sales of similar property. Development adjacent to or in the area of a riparian property raises the value of the property and its property tax, increasing pressure to develop or sell the property for more intense land use, and reducing public benefits of lower impact land uses.
- A property tax system based on actual land use, including incentives to maintain land use with higher public benefit, particularly in riparian areas, would be beneficial for the environment and public enjoyment, as well as for ownership by people with lower economic capability.
- An effective tax system indexed to actual land use should be easy to administer and not reduce total taxes collected.
- A system with broad-based public understanding and participation helps reinforce the value of incentives for land use with greater public benefits.
- An example approach includes stormwater utility fees having categories of runoff based on land cover and stormwater retention, with lower assessments for lower runoff potential.

Rudberg, E. A. and Fulton, D. C.; "A Study of Landowner Attitudes and Beliefs of Vegetative Buffers in Minnesota Lakes"; USGS, Minnesota Cooperative Fish and Wildlife Research Unit, UMN; Draft, January 2010

- Purpose is to understand the attitudes, values, and overall motivators for lakeshore owners to restore or maintain native vegetative buffers.
- Funding provided by DNR Division of Fish and Wildlife.
- Included a statewide sampling and survey of lakeshore homeowners.
- Based on draft analyses, approximately ¼ of respondents indicate that no payment would be necessary to restore a native vegetative buffer and approximately ¼ of respondents indicate that they would not restore for any amount of payment.
- Education and on-the-ground technical assistance were identified as significant incentives to promote native vegetative buffers.
- Approximately 40% of respondents indicated a willingness to spend some amount on restoration, with a wide range from hundreds of dollars (many respondents) to tens of thousands of dollars (a few respondents).

Perspectives of Drainage Work Group Members and Others

Drainage Work Group

- Drainage Work Group (DWG) members were not aware of existing data sets or studies available statewide regarding conditions of riparian buffer areas.
- In regard to the question about the extent to which riparian areas are being used in ways that risk environmental damage to public waters, DWG members expect differing definitions of riparian land uses that constitute a risk to public waters.
- DWG members have limited expertise regarding what does or doesn't work for tax incentives for preservation of riparian buffers, but know about the benefits and challenges of various contract, cost-share and conservation easement programs for establishment and maintenance of conservation lands, including riparian buffers (e.g. funding, adequacy of incentives, education, marketing, and technical assistance).

Members of Study Advisory Committee

- DWG members reflected a cross section of perspectives of the DWG.
- Professor Steve Taff, Dept. of Applied Economics, UMN, shared the perspective found in the literature questioning whether tax incentives typically are large enough to motivate land use change, or may only reward landowners who would have made a change without the tax incentive.
- Jeff Forester, Exec. Dir., MSRPO, shared a perspective that tax incentives for riparian protection in other states have had the following problems: 1) lack of broad application and public support; 2) not large enough to affect behavior; and 3) too expensive to pay for and administer. Jeff suggested that an effective property tax incentive program should be: 1) broad-based, so as to have wide application, public understanding and support, and to protect the greatest amount of land; 2) create a large enough differential between publicly desirable and undesirable land cover and use; 3) be revenue neutral for state and local governments, and 4) be easy to administer. He expects a property tax incentive to work better for lakeshore and forestland than agricultural land, due to the potential tax differential for publicly desirable and undesirable riparian land use.
- Local government representatives had concerns about potential workload and costs associated with implementation and enforcement of a property tax incentive program at a time when county budgets and staffing are greatly constrained.
- Committee members appreciated the benefits of multiple types of incentives for riparian buffer restoration and preservation on private lands.

Minnesota Association of County Officers (MACO) Drainage Committee

- Members are county auditors and treasures who work with county assessors and were consulted at their semi-annual meeting in January 2010.
- Members shared concerns about property tax incentive effectiveness, workload and costs associated with program implementation, record keeping and enforcement.

Summary of Findings

1) GIS data layers currently are not available to enable a reliable statewide evaluation of land cover and use within riparian areas along public waters statewide.
2) Differing perspectives and definitions are expected regarding riparian land uses and situations that constitute a risk to public waters.
3) The Public Drainage Ditch Buffer Study (2006) indicated that the total buffered public drainage ditch miles per county, including Section 103E.021 buffers, conservation program buffers and natural buffers, ranged from 15% to 95%, with the lowest percentages generally in highly agricultural counties and the highest percentages in counties with high amounts of forestlands, wetlands, pastureland, hayland and/or low total miles of public drainage ditch.
4) The Cannon River Watershed Partnership Shoreland Mapping Project (2008 – 2010) is hand digitizing land cover boundaries within 300 ft. of public watercourses in 10 southeast Minnesota counties, based on high resolution aerial photographs and the Minnesota Land Cover Classification System. A GIS evaluation by BWSR of riparian land use in the 5 counties for which mapping has been completed to date (Rice, Goodhue, Wabasha, Mower and Winona Counties) indicates approximately 60 acres to 400 acres of cropland per county within 50 ft. of public watercourses.
5) In addition to nationwide federal conservation programs, a number of states have additional programs for restoration and protection of riparian buffers involving financial assistance, technical assistance, conservation easements, state income tax incentives and/or property tax incentives. These programs generally have limits on available funding and, therefore, program participation.
6) Programs in Minnesota that include riparian buffer implementation include CRP, RIM, CREP, WRP, RIM-WRP, EQIP, Native Buffer Cost-Share Program, and Clean Water Fund Riparian Buffer Easement Program. These programs involve contracts, conservation easements and cost-share, with associated technical assistance. Locations of associated riparian buffers along public waters are numerous throughout the primarily agricultural areas of Minnesota.
7) A limited literature search indicates that landowner motivations for land use decisions and implementation of conservation practices can involve a number of factors, including:
    a) Cost and ease of implementation relative to incentives.
    b) Opportunity costs, including development pressure, land values, and commodity prices.
    c) A landowner's perception of a problem at the farm/home level. Successful riparian restoration and protection programs educate landowners about the exact nature of the problem, demonstrate benefit to the local environment, illustrate the role the individual plays in the process, and provide effective, workable solutions.

d) Technical assistance, particularly when programs and practices are first introduced and when conservation practices are complex or unfamiliar.

e) Marketable compensation to participating landowners, based on targeting where it is most effective for conservation.

f) Landowner trust in the marketers of a program and effective follow-up.

8) Monetary incentives alone are often too small to fundamentally change land use decisions and may only reward a landowner for activity he or she was likely to do without a small monetary incentive.

9) An advisory committee member representative of lakeshore and forest landowners proposes that a broad-based property tax incentive, with adequate tax differential for publicly desirable vs. undesirable riparian land cover and use could work well for riparian forest and lakeshore buffer preservation. (See more specifics under perspectives of Members of Study Advisory Committee above.) Property tax has an existing statewide delivery system with periodic inspection, although a different expertise would be needed for riparian buffer technical assistance and inspection.

10) Local government representatives consulted about property tax incentives for riparian buffer preservation have concerns about effectiveness, as well as potential workload and costs associated with implementation and enforcement of a property tax incentive at a time when county budgets and staffing are greatly constrained.