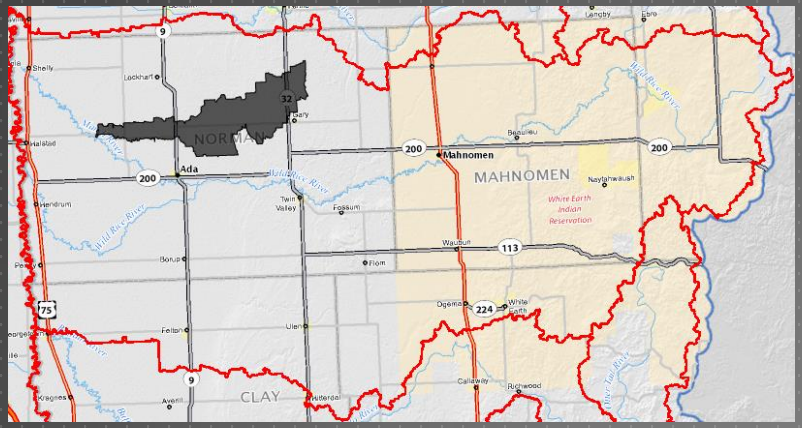
GREEN MEADOW PROJECT TEAM



3rd Meeting

February 27th, 2014

Wild Rice Watershed District Offices

PROJECT TEAM GOAL

- Develop viable strategy option(s) to solve known problem(s) within Upper Green Meadow Subwatershed for Wild Rice River Watershed District Board of Managers consideration

- Completion: Spring 2014

- Anticipate ~~1 – 6~~ 2-3 Meetings

AGENDA 2/27/14

- Project Team Process/Roles and Responsibilities (Review)
- Last Meeting Outcomes (Review)
- Draft Goals (action)
  - FDR - Jerry
  - NRE - Henry
- Range of Alternatives Subject to Detailed Analysis (action)
- Adjourn

PROCESS

…SOME RELEVANT QUOTES

"Never mistake activity for accomplishment"

(John Wooden, 1910-2001)

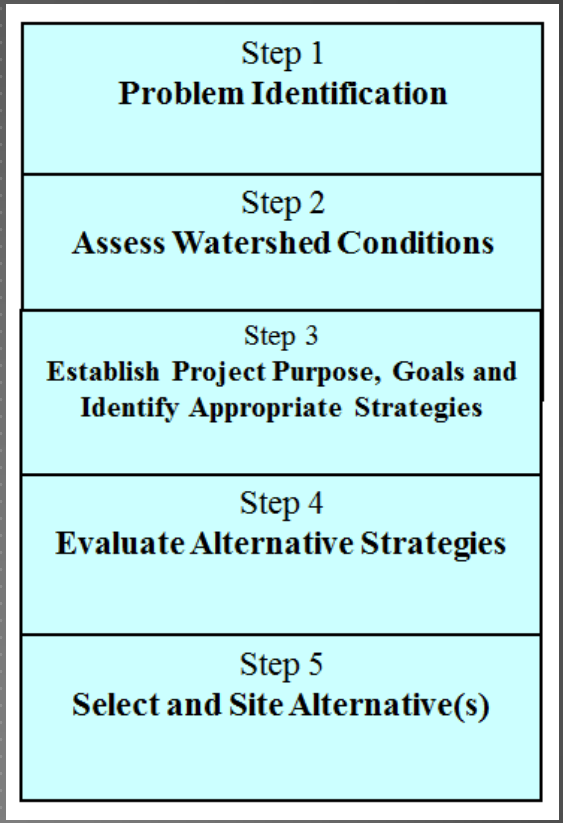
"The key to failure is trying to please everybody"

(Bill Cosby, 1937 -)

PROCESS

…PROJECT DEVELOPMENT STEPS

1. Problem Identification
2. Existing Watershed Condition
3. Goal(s), Purpose, and Need
4. Range of Alternatives/Alternatives Evaluation
5. Selection of Preferred Alternative(s)



PROCESS
….ROLES AND RESPONSIBILITIES

- **WATERSHED DISTRICT (Statutory Authority)**
  - Identify Areas of Concern
  - Invite Stakeholders to Serve on PT
  - Coordinate Meetings
  - Arrange for Facilitator
  - Record Keeping
  - Communication with PT Members
- BOARD MEMBERS
  - PT Direction, Focus, Support
  - Considering Alternatives
  - Taking Action (DECISION-MAKING BODY)

PROCESS

…ROLES AND RESPONSIBILITIES

- UPPER GREAN MEADOW PROJECT TEAM
  - Represent Stakeholder Constituency
  - Identify Problems and Opportunities for FDR/NRE
  - Formulate and Evaluate Alternative(s) to Address Problems and Opportunities
  - Recommend Preferred Alternative to Wild Rice Watershed District Board
  - Identify and Clarify Regulatory Requirements and Permitting
  - Review/Comment on Key Project Documents
  - Assist if the Formulation of Operating/Monitoring Plans

  - DECISION-MAKING…

PROCESS

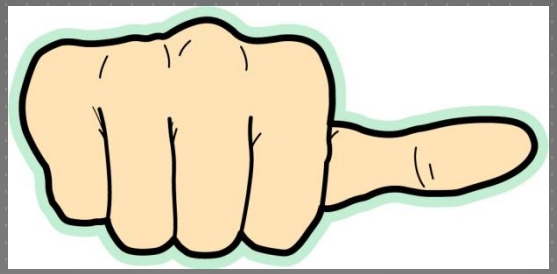
. . . PROJECT TEAM DECISION-MAKING

- Consensus – Individuals ***collectively*** make a choice

PROCESS

. . . PROJECT TEAM DECISION-MAKING

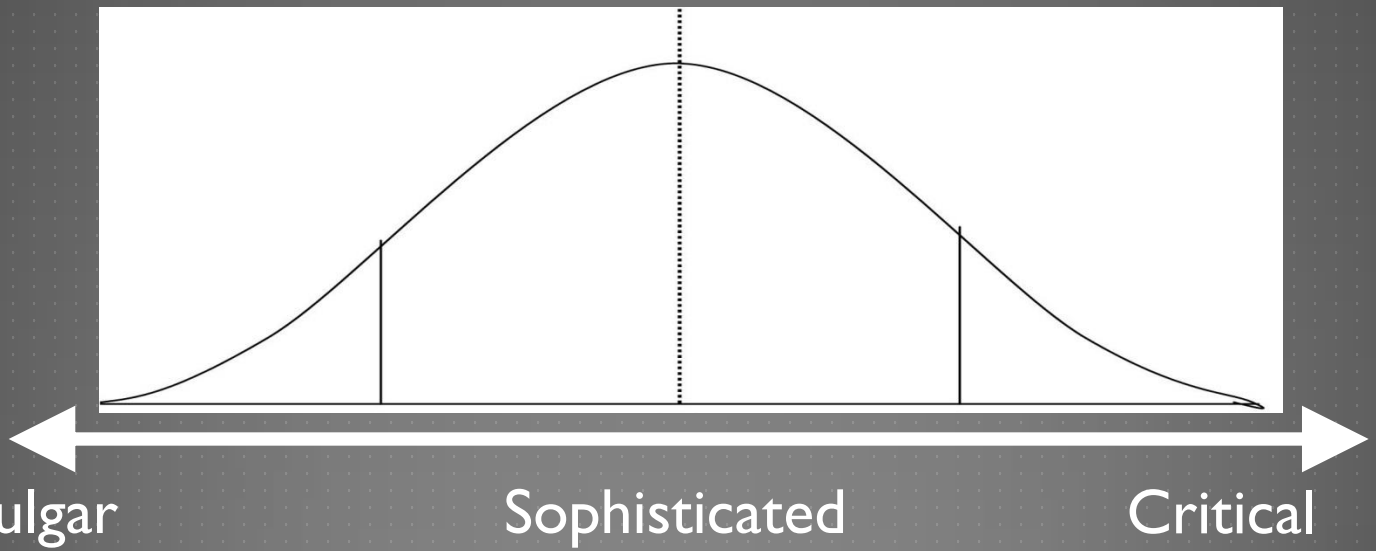
- "I CAN LIVE WITH IT"



PROCESS – FINAL WORD

. . . PROJECT TEAM DECISION-MAKING

- Consensus – Individuals ***collectively*** make a choice
  - ***"I can live with it"***
- Three Kinds of Believers (C. Wright Mills)



PROCESS
…ROLES AND RESPONSIBILITIES

- Facilitator/Watershed Administrator/Consulting Engineer/FDRWG Coordinator
  - NOT PT Member – no participation in developing alternatives
  - Guide PT – FDRWG Mediation Agreement
  - Monitor - Ground Rules, PT Dynamics
  - Ask Questions
  - Clarify Issues
  - Worker Bee
    - Provide Information
    - Manage Process
    - Create Products (notes, reports, etc.)

GROUND RULES/EXPECTATIONS
…PROJECT TEAM MEETING/DISCUSSION

- Everyone Participates
- No Single "Right" Answer
- Keep an Open Mind (Sophisticated Thinker)
- Listen to Others
- Keep Discussion on Track
- Try to Understand the Views with Whom you Disagree
- Ask Questions
- Disagreements OK
- Strive for "I can Live with it"

GROUND RULES/EXPECTATIONS
…PROJECT TEAM COMMUNICATION

- Constituency – Communication Lead
  - Watershed District Board - WD Administrator
  - Press Media – WD Administrator
  - Stakeholders – Project Team Members

- If consensus cannot be reached, the Project Team member(s) with a minority opposing opinion, shall work with the "Additional Resources Team" to prepare a minority report for the Wild Rice Watershed District Board

GROUND RULES/EXPECTATIONS
…PROJECT TEAM PARTICIPATION

- "Snooze you Loose" Rule

GOAL(S)

- The DESIRED result the Green Meadow Project Team envisions, plans and commits to achieve.
  - An articulated end-point

DRAFT
GREEN MEADOW SUBWATERSHED GOALS

Goal 1: Reduce local, Regional, and Basin-wide flood damages to public and private infrastructure *(4 Objectives)*

Goal 2: Improve the Health of Natural Resources in the Green Meadow subwatershed *(6 Objectives)*

GOAL 1: REDUCE LOCAL, REGIONAL, AND BASIN-WIDE FLOOD DAMAGES TO PUBLIC AND PRIVATE INFRASTRUCTURE

Objective #1: Reduce Subwatershed Peak Volume and Flows

- *Reduce peak flows by 10-15% and flood volumes by 40-45% from the Green Meadow Subwatershed area.*

Objective #2: Improve Overall Dam Safety of the Existing Green Meadow Dam

- Improve the ability of the Green Meadow Dam to handle large rainfall or runoff events without overtopping the emergency spillway. Specifically, strategies should reduce the risk of the structure's failure resulting from a 100-yr rainfall or runoff event.

GOAL 1: REDUCE LOCAL, REGIONAL, AND BASIN-WIDE FLOOD DAMAGES TO PUBLIC AND PRIVATE INFRASTRUCTURE

Objective #3: Reduce Risk of Road Damages

- Eliminate the risk of road overtopping and washout to be consistent with current design standards (i.e. State Highway and County State Aid Highway (50yr) and Local/Township (10-25yr))

Objective #4: Reduce Agricultural Land Damages

- Reduce damages to agricultural fields from a 10 year 24 hour runoff event.

GOAL 2: IMPROVE THE HEALTH OF NATURAL RESOURCES IN THE GREEN MEADOW SUBWATERSHED

Objective #1: Improve Hydrologic Conditions

- Reduce peak flows and the volume of peak runoff throughout the watershed by at least 20%. Hydrologic conditions of this watershed are considered "flashy". Flows reach a peak quickly and the drop to low flow conditions. In addition, there is extended periods of low/no flow in some watercourses compared to conditions found historically.

Objective #2: Protect and Enhance Existing Upland, Wetland, and Aquatic Habitats

- Protect the existing habitats from degradation and loss. The existing habitats in the subwatershed which provide benefits to fish and wildlife and water quality should be protected.

Objective #3: Restore Wetland and Grassland in High Priority Areas

- Restore at least one wetland and grassland complex with a minimum size of 640 acres within the high priority area of subwatershed for wetland and grassland restoration.

GOAL 2: IMPROVE THE HEALTH OF NATURAL RESOURCES IN THE GREEN MEADOW SUBWATERSHED (DRAFT).

Objective #4: Improve Stability of Watercourses

- Improve the stability of the Spring Creek and State Ditch 68 below the Green Meadow Dam and other watercourses with substantial lateral erosion, aggradation, and/or downcutting.

Objective #5: Reduce Sediment and Nutrient Loading from Upland Sources

- Reduce sediment and nutrient loading from high priority areas.

Objective #6: Improve Soil Health

- Improve soil health by implementing best management practices including but not limited to: cover crops, residue management, and no-till/strip tillage

STRATEGY

- Eliminate Strategy(s) from future consideration to solve problem and accomplish goals
  - Provide a rationale
- Product: Strategies/Alternatives for Consideration
  - Subject to Detailed Analysis
  - Preferred Alternatives

Greed Meadow Subwatershed is Located in the Early/Middle Upstream Area in the Red River of the North Basin

Refer To TSAC Technical Paper #11: "Red River Basin Flood Damage Reduction Framework"

	Red River Timing Zone (Emerson)		
FLOOD DAMAGE REDUCTION MEASURE	EARLY	MIDDLE	LATE
1) Reduce Flood Volume	+	++	++
a) **Wetlands** (providing infiltration and evapotranspiration)	+	+	++
b) **Cropland BMPs** (increase infiltration and evapotranspiration)	+	++	++
c) **Conversion to Grassland** (e.g., CRP and RIM to increase infiltration and evapotranspiration)	+	++	++
d) **Conversion to Forest** (forested areas generally have the lowest runoff coefficients, due to high interception and evapotranspiration)	+	++	++
e) **Other Beneficial Uses of Stored Water** (domestic, industrial, streamflow augment,...)	+	++	++
2) Increase Conveyance Capacity	+	-	--
a) **Channelization** (increasing the flow capacity of existing channels or flowages)	+	-	--
b) **Drainage** (creating new or improved conveyance capacity)	+	-	--
c) **Diversion** (of flood waters around a current damage area)	+	Variable	-
d) **Setting Back existing Levees** (to increase conveyance capacity)	+	-	--
e) **Increase Roadway Crossing Capacity** (increase conveyance potential)	+	-	-
3) Increase temporary Flood Storage	Variable	++	+
a) **Gated Impoundments** (longer-term detention of water in excess of downstream channel capacity)	+	++	++
b) **Ungated Impoundments** (shorter-term detention of water in excess of downstream channel capacity)	-	+	+
c) **Restored or Created Wetlands** (functioning as impoundments)	-	+	+
d) **Drainage** (to lower surface water and groundwater levels, which increases infiltration and temporary storage in the upper soil horizons)	-	+	++
e) **Culvert Sizing** (to increase temporary storage by widespread metering of runoff close to its source)	-	+	+
f) **Setting Back Existing Levees** (to increased floodplain storage)	+	++	+
g) **Overtopping Levees** (to utilize diked floodplain storage capacity when critically needed)	++	+	Variable
4) Protection/Avoidance	Variable	Variable	Variable
a) **Urban Levees** (community protection)	-	-	-
b) **Farmstead Levees** (rural property protection)	-	-	-
c) **Agricultural Levees** (agricultural property protection)	-	-	-
d) **Evacuation of the Floodplain** (removing flood prone property)	0	0	0
e) **Floodproofing** (raising property and flood resistant materials)	0	0	0
f) **Warning and Emergency Response** (notification processes)	0	0	0

Suggested	
Eliminate	
Further consideration - with caution/caveats	
Further consideration	

Greed Meadow Subwatershed is Located in the Early/Middle Upstream Area in the Red River of the North Basin

Refer To TSAC Technical Paper #11: "Red River Basin Flood Damage Reduction Framework"

	Red River Timing Zone (Emerson)			*Strategy Applicability*	*Additional Information*
FLOOD DAMAGE REDUCTION MEASURE	EARLY	MIDDLE	LATE	Primary/ Secondary	General Decision Rationale
1) Reduce Flood Volume	+	++	++		
a) Wetlands (providing infiltration and evapotranspiration)	+	+	++	Primary	Depressional areas within the landscape capture runoff and allow time for evaporation and infiltration to occur, which normally results in natural seasonal drawdown. This drawdown storage is replaced during subsequent runoff events which reduces the downstream flood volume. However, most depressional areas only have enough capacity to retain an initial portion of the runoff associated with major flood events. Therefore, from the standpoint of timing to reduce main stem flood peaks, these will be most beneficial when located within late contributing areas.
b) Cropland BMPs (increase infiltration and evapotranspiration)	+	++	++	Secondary	Ability to implement? - Based on Natural Resources Conservation Service (NRCS) runoff estimating procedures, a reduction in runoff of about 5% to 8% typically may be expected with conservation tillage practices.
c) Conversion to Grassland (e.g., CRP and RIM to increase infiltration and evapotranspiration)	+	++	++	Secondary	Ability to implement? - A typical reduction in storm runoff is estimated to be about 50% compared to row-cropped lands with conventional tillage methods. However, the effects on snow accumulation and spring snowmelt runoff have not been well documented.
d) Conversion to Forest (forested areas generally have the lowest runoff coefficients, due to high interception and evapotranspiration)	+	++	++	Secondary	Ability to implement? - Forestland produces much less rainstorm runoff than cultivated cropland. A typical reduction is estimated to be about 55%.
e) Other Beneficial Uses of Stored Water (domestic, industrial, streamflow augment,...)	+	++	++	Primary	Would need to be incorporated into an impoundment site? - Stored water can be used for domestic or industrial purposes, or for stream flow augmentation during drier periods of the year to improve fish habitat and provide other instream flow benefits. Use of this water results in drawdown of the reservoir, providing annual removal of water from the spring flood volume.
2) Increase Conveyance Capacity	+	-	--		
a) Channelization (increasing the flow capacity of existing channels or flowages)	+	-	--	Primary	Channelization projects are usually done to decrease local flooding. The hydrologic effect is a decrease of floodplain storage, acceleration of flow, and a corresponding increase in local peak flood flows on the channelized stream. . Projects located in early water areas relative to the main stem will tend to reduce main stem flood peaks, whereas projects located in late water areas will tend to increase main stem flood peaks.
b) Drainage (creating new or improved conveyance capacity)	+	-	--	Primary	Increasing the capacity of a drainage channel will reduce the frequency of adjacent land flooding, but will have a related increase in peak discharge rates immediately downstream. The impact on flood-prone areas farther downstream will depend on relative locations. Removing early water faster will decrease main stem flood peaks. Removing late water faster will increase main stem flood peaks. Determinations of the adequacy of an outlet should consider the effects on downstream flooding, both within and downstream from the drainage system, for various magnitudes of flood events.
c) Diversion (of flood waters around a current damage area)	+	Variable	-	N/A	Unrealistic operational feasibility and logistics. No reasonable expectation of land acquisition. Fails to address mainstem flow reduction/watershed storage goal.
d) Setting Back existing Levees (to increase conveyance capacity)	+	-	--	Primary	Moving the levees back farther away from the channel will restore a portion of the lost floodway capacity. Doing so with a primary purpose of increasing conveyance will primarily benefit lands upstream from the levee encroachment. The downstream effects in this situation may include an increase in peak flows, due to the reduction in upstream floodplain storage. However, this may be offset by increased floodplain storage within the setback levee reach.
e) Increase Roadway Crossing Capacity (increase conveyance potential)	+	-	-	Primary	Increasing road crossing capacity may increase downstream peak flows, due to reduction in upstream floodplain storage.
3) Increase temporary Flood Storage	Variable	++	+		
a) Gated Impoundments (longer-term detention of water in excess of downstream channel capacity)	+	++	++	Primary	
b) Ungated Impoundments (shorter-term detention of water in excess of downstream channel capacity)	-	+	+	Primary	Neutral (early, middle area). Proceed with caution for concern of not detaining flow long enough from middle zone
c) Restored or Created Wetlands (functioning as impoundments)	-	+	+	Primary	Neutral (early, middle area). Proceed with caution - Wetlands with temporary flood storage are most beneficial for main stem flood control when located in middle and late contributing areas of the basin.
d) Drainage (to lower surface water and groundwater levels, which increases infiltration and temporary storage in the upper soil horizons)	-	+	++	Secondary	Ability to implement (e.g. tile management) Drainage alone will not allow us to accomplish the goals/objectives. WD already has authority to encourage/force drainage BMPs - The most appropriate application for drainage is on existing agricultural land where a high water table restricts the crop rooting depth. The additional temporary storage capacity provided will be most beneficial for main stem peak flow reduction when implemented in middle and late areas relative to the main stem.
e) Culvert Sizing (to increase temporary storage by widespread metering of runoff close to its source)	-	+	+	Primary	Caution where this is applied (early water areas) - must be basin-wide - Culvert sizing provides relatively short-term storage. It is most effective in reducing main stem flooding if implemented in middle and late contributing areas of the basin.
f) Setting Back Existing Levees (to increased floodplain storage)	+	++	+	Primary	Moving existing levees back, farther away from the channel, will restore a portion of the lost floodplain storage, benefiting downstream areas by helping to attenuate flood peaks. However, there may be a corresponding negative effect on downstream areas, due to increased floodway capacity that decreases backwater effects and may reduce upstream floodplain storage.
g) Overtopping Levees (to utilize diked floodplain storage capacity when critically needed)	++	+	Variable	Primary	structure (design or gated) that would allow water to overflow to land outside levee. - Overtopping levees are most effective when located at or near the area that needs protection, because proper timing of the storage is automatically provided. These levees will be most beneficial for the main stem when located in early and middle runoff timing areas of the basin.
4) Protection/Avoidance	Variable	Variable	Variable		
a) Urban Levees (community protection)	-	-	-	N/A	No urban flood damage areas in the Green Meadow subwatershed
b) Farmstead Levees (rural property protection)	-	-	-	N/A	No Project Team did not identify urban damages
c) Agricultural Levees (agricultural property protection)	-	-	-	N/A	No, does not fit FDR Goals/Objective #1
d) Evacuation of the Floodplain (removing flood prone property)	0	0	0	N/A	No Project Team did not identify private infrastructure damages
e) Floodproofing (raising property and flood resistant materials)	0	0	0	N/A	No Project Team did not identify private infrastructure damages
f) Warning and Emergency Response (notification processes)	0	0	0	N/A	Unrealistic logistics, lack of proven/existing technology, and cost prohibitive - Green Meadow subwatershed is a remote and rural area with no established flood warning infrastructure (equipment and models).

NEXT STEPS ASSIGNMENT

- Strategy/Alternative Development
  - Map
- Adjourn