Upper Mississippi River System
2018 Water Level Management Workshop
Grand River Center - Dubuque, Iowa
January 30, 2018

Attendance List

Mike Griffin	Iowa Department of Natural Resources
Kirk Hansen	Iowa Department of Natural Resources
Megan Moore	Minnesota Department of Natural Resources
Matt Vitello	Missouri Department of Conservation
Bryan Hopkins	Missouri Department of Natural Resources
Jim Fischer	Wisconsin Department of Natural Resources
Dave Busse	U.S. Army Corps of Engineers
Steve Clark	U.S. Army Corps of Engineers
Dan Cottrell	U.S. Army Corps of Engineers
Jodi Creswell	U.S. Army Corps of Engineers
Charlie Deutsch	U.S. Army Corps of Engineers
Russell Errett	U.S. Army Corps of Engineers
Dan Fasching	U.S. Army Corps of Engineers
Jon Hendrickson	U.S. Army Corps of Engineers
Marv Hubbell	U.S. Army Corps of Engineers
Brian Johnson	U.S. Army Corps of Engineers
Kevin Landwehr	U.S. Army Corps of Engineers
Karen Haggerty	U.S. Army Corps of Engineers
Ben McGuire	U.S. Army Corps of Engineers
Elizabeth Nelsen	U.S. Army Corps of Engineers
Lane Richter	U.S. Army Corps of Engineers
Joan Stemler	U.S. Army Corps of Engineers
Randy Urich	U.S. Army Corps of Engineers
Sara Schmuecker	U.S. Fish and Wildlife Service
Mary Stefanski	U.S. Fish and Wildlife Service
Mark Gaikowski	U.S. Geological Survey
Jeff Houser	U.S. Geological Survey
Kevin Kenow	U.S. Geological Survey
Teresa Newton	U.S. Geological Survey
Olivia Dorothy	American Rivers
Tim Schlagenhaft	Audubon
Gretchen Benjamin	The Nature Conservancy
Kirsten Mickelsen	Upper Mississippi River Basin Association
Josh Ney	Upper Mississippi River Basin Association
Lauren Salvato	Upper Mississippi River Basin Association

2017 Water Level Management (WLM) Workshop

Kirsten Mickelsen provided a brief summary of UMRBA's April 4-5, 2017 UMRS water level management (WLM) workshop. Mickelsen explained that workshop's purposes were to 1) clarify misunderstandings among partners about the feasibility and policy requirements for implementing water level management at a pool scale and 2) inform any recommendations about its use as a tool to improve ecological health and resilience.

Mickelsen recalled that Jeff Houser provided an overview of how water level management may affect fundamental drivers to ecological health and resilience and then Corps staff gave detailed presentations about how they approach water level management, including channel maintenance, lock operations, and river level forecasting. The intent being that partner recommendations for WLM within and outside of existing operating bands are well-informed regarding the costs and implementation factors.

Mickelsen described the recommendations that the workshop attendees identified as priorities. Ultimately, the six highest priority recommendations included being opportunistic within the operating band, addressing policy limitations, performing a benefit-cost analysis, implementing drawdowns in Pools 13 and 18, exploring funding sources, and improving knowledge of hydraulics and hydrology. In addition, attendees requested more frequent communication among partners that would be involved in pool-scale WLM and increased engagement with the public.

Partner Reports on 2017 Activities

UMRBA – Kirsten Mickelsen reported that she presented the outcomes of the April 2017 workshop to the UMRBA Board at its May 23, 2017 quarterly meeting. In response, the Board requested an action plan for the Association's work in 2017 to 2018. Mostly, this included organizing and convening a system-wide WLM team, requesting pool-scale WLM as appropriate, and hosting a workshop in 2018. The Board approved the work plan at its August 8, 2017 meeting and directed staff to execute a planning assistance to the states (PAS) agreement with the U.S. Army Corps of Engineers (USACE) to leverage resources. Mickelsen explained that the PAS requires a fifty percent non-federal contribution. UMRBA worked with non-federal sponsors to scope the PAS terms, which are broad and directly reflect the partner recommendations from the 2017 WLM workshop. The non-federal match amounts to $60,000 annually for three years with partners including UMRBA, the five states, The Nature Conservancy, Audubon, American Rivers, and Waterways Council.

Audubon – Tim Schlagenhaft said Audubon is creating two videos for the purposes of raising awareness and educating the public of the benefits of drawdowns on the Upper Mississippi River, including improving habitat for flora and fauna, and inspiring viewers to contact their legislators to vocalize the need for funding WLM. The videos give a broad generalization of the scientific concepts. In response to suggestions from participants, Schlangehaft said he will request that the vidoes include links to scientific information on a range of topics – e.g. mussels, ecosystems, scientific reports and research. Schlangenhaft anticipates that the videos will available for widespread distribution in spring 2018, and will share the videos for partners to utilize and distribute further. Audubon has also partnered in the ongoing drawdown effort in Pools 24 through 26.

St. Louis District Report – Joan Stemler presented the results of environmental pool management (EPM) in Pools 24 through 26 during the 2017 season, including the duration achieved for a one-foot and two-foot drawdown in each pool and the days during which active management was ongoing. Stemler explained the District's outreach activities with navigation and recreation stakeholders. While initial reactions may be negative, Stemler acknowledged that stakeholders become supportive once they understand the general implementation and the longer term benefits.

Ben McGuire discussed results of biological response monitoring in Pools 24 through 26 as part of a large-scale biological assessment occurring in 2015 through 2018. The assessment is funded by the Sustainable Rivers Project. The vegetation is showing tremendous response in terms of species richness, percent cover, and seed production. Given the number of seeds produced and acres covered, duck energy days are estimated at 8,125,440 or 135,424 for a 60-day period. While an increase from historic values, McGuire noted that the system is not yet operating at full capacity. The benefits of sediment consolidation have also been documented, including facilitating the resurgence of perennial submerged aquatic vegetation. There have also been observed Least tern nests that are believed to be the result of the WLM successes.

In response to questions, Stemler and McGuire said USACE is interested in employing more detailed research regarding biological responses. This includes spring macroinvertebrate populations to inform migratory bird consumption along the corridor, waterfowl use, and fish spawning.

Rock Island District – Kevin Landwehr said the Rock Island District has held several internal conversations regarding WLM implementation over the past year. Landwehr explained that USACE will need the states to clarify their positions regarding WLM to proceed. States have precluded WLM implementation in the past given concerns regarding impacts to fish and mussels. USACE is exploring WLM opportunities in tributaries, such as modifying regulating dams on the Des Moines River.

St. Paul District – Steve Clark reported that the majority of the St. Paul District's work over the past year has revolved around finishing the Pool 8 White Paper and facilitating discussion on the results. District staff have also been working on an opportunistic drawdown at Pool 10 (see *St. Paul District's update on Pool 10).*

USFWS – Mary Stefanski provided a brief update of the St. Paul District's WLM Task Force (WLMTF). Stefanski also mentioned that Refuges implement small-scale drawdowns when resources are available. Sara Schmuecker said she has remained engaged with HNA II. Stefanski and Schmucker both mentioned their consultation regarding potential drawdowns through their participation on on-site inspections teams.

USGS – Teresa Newton said USGS has not done active research regarding WLM in 2017. However, USGS researchers have monitored vegetation and mussels pre- and post-drawdowns in the past.

Minnesota DNR – Megan Moore said MN DNR met with senior level staff and confirmed their support for the agency's continued WLM work.

Iowa DNR – Mike Griffin said IA DNR remains engaged in the St. Paul WLMTF. Small-scale drawdowns routinely occur at managed areas like Lake Odessa and Green Island. Griffin said he is working to formulate a request for including pool-scale WLM as part of UMRR's next generation of habitat projects.

Missouri DoC – Matt Vitello has participated on planning calls regarding the Pools 24 through 26 drawdowns and been involved in the discussions regarding monitoring fisheries impacts.

American Rivers – Olivia Dorothy said she has provided feedback to Tim Schlagenhaft on Audubon's drawdown videos. Dorothy said American Rivers recently hired Brad Gordon as a fellow who will become more involved with the partners.

The Nature Conservancy – Gretchen Benjamin has stayed involved with WLM in Pools 24 through 26. TNC is working in partnership with the Corps' Sustainable Rivers Project through a PAS agreement.

Pool 8 White Paper

Steve Clark provided a brief overview of the results of the Pool 8 White Paper, a preliminary assessment of drawdowns at Pool 8 that would extend beyond the operating band. The paper evaluates various channel maintenance methods and procedures, costs, and the necessary requirements for implementing a drawdown. Dredging is estimated at $414,000 or $959,000 annually on a three-year WLM cycle and $244,000 or $575,000 annually on a five-year cycle. The lower cost is more realistic and includes cost savings for WLM occurring in back-to-back seasons. However, traditional accounting mechanisms do not currently allow for capturing those cost savings and thus the higher funding level is used in cost-benefit analyses. These accounting issues are not specific to St. Paul District and would need to be resolved through USACE's Office of Counsel.

A feasibility study is required to implement a drawdown beyond the operating band, including for Pool 8 as outlined in the white paper. The estimated cost for a feasibility study is between $700,000 and $2,000,000, including associated NEPA requirements.

Questions remain regarding how to fund a feasibility study and WLM implementation. Workshop participants discussed the availability and feasibility of funding pool-scale WLM (beyond the operating band) through NESP and UMRR, Sections 206 and 1135, and O&M for the 9-foot navigation channel. USACE staff noted that it is able to accept funding through the O&M account for purposes like WLM. However, many policy questions were raised including the need for a project sponsor and whether NESP's navigation servitude provision could allow for full federal funding.

Participants recognized that many of the existing questions for drawdowns outside of the operating band will need to be explored through a feasibility study. One suggestion was to utilize different authorities for the feasibility study and actual implementation. Participants discussed the possibility of the PAS agreement to develop aspects of a feasibility study.

Planning for WLM in 2018

Vision and mission for WLM system team

Workshop attendants were organized into six groups to brainstorm a mission and vision statement for the WLM system team. Each group shared their statements and then all participants discussed the overarching themes. Ultimately, participants agreed to the following statements:

- Vision – Improve ecological health and resilience through optimal water level variation
- Mission – To promote systemic, routine, and coordinated water level variation, address policies and funding needs, advance interdisciplinary monitoring and research, and inform and engage the public.

2018 priorities and tasks

Participants identified recommended action-oriented tasks for 2018 and prioritized them in the following priority order:

- Implement pool-scale drawdowns in Pools 13 and 18 (beyond the operating band)
    - Facilitate conversations with IL DNR
    - IA DNR make a formal request
- Perform opportunistic drawdowns in Pool 10

- Explore solutions to issues affecting feasibility (e.g., as outlined in the Pool 8 White Paper)
- Determine mechanisms and seek funding for implementation (e.g., UMRR)
- Establish monitoring protocols (utilizing existing protocols where possible) and perform monitoring on an opportunistic basis

UMRBA – Mickelsen said UMRBA staff will organize and convene a system-wide WLM team, working with Brian Johnson regarding the team's composition. UMRBA will also organize a call among relevant staff for executing the PAS agreement to discuss expectations for accounting and reporting.

St. Paul District's update on Pool 10

Dan Fasching discussed the unique components of Pool 10 and the opportunities for drawdown. Pool 10 is unique to the St. Paul District with a three stage control. USACE's plan is to operate Pool 10 like the other pools with a secondary control point. Should this approach have been an option in the past, there would have been four opportunities over the last 10 years for drawdowns that exceed 30 days. This drawdown would remain within the operating band. There is concern about the public's reaction to the drawdown, especially marina owners, but will do outreach pre-implementation.

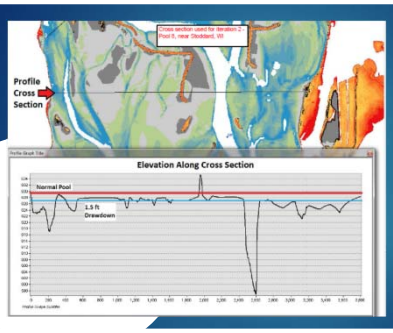
Water Level Management

KIRSTEN MICKELSEN

JANUARY 30 , 2018 UMRBA MEETING

Everybody Loves WLM*
…So What's the Hold Up?

* Caveats



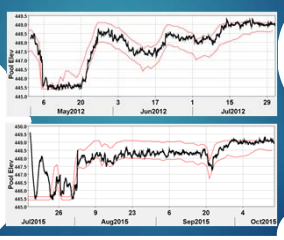
Keys to success:

- Time frame
- Duration
- Depth

DEEP DRAWDOWN

SPECTRUM

WITHIN BAND



*Caveats

- Mechanical
  - Pool management
  - Lock operations
  - Channel maintenance
  - Extra expense in limited budgets
- Biological
  - Mussels
  - Fish

The hold up….

Time for a partnership chat…

APRIL 4-5, 2017 WLM WORKSHOP
DUBUQUE, IOWA

Objectives

1) Reach a common understanding of implementation mechanics and stakeholder perspectives
2) Reach consensus on a suite of recommendations

Participants

State resource agencies
+ Illinois DOT
Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Geological Survey
National Weather Service
American Rivers, Audubon, TNC
Waterways Council
UMRBA
= 48 individuals

Agenda

DAY 1
Opening remarks/partner perspectives
Multi-purpose management
Ecosystem resilience
District pool operations

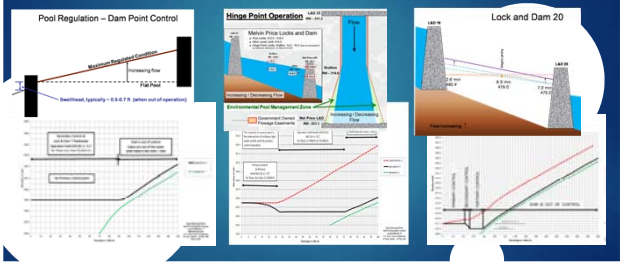
DAY 2
Facilitated discussion

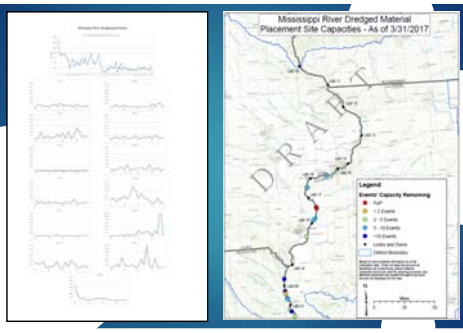
Things We Learned…

Controlling variables that may be directly or indirectly affected by WLM

	Lotic	Lentic	Floodplain	
Depth	■	■		Water surface elevation - bed elevation= depth
Velocity	■	■		Complex effects on velocity depending on geomorphology
Substrate		■		Sediment drying/compaction can affect substrate characteristics
Total suspended solids		■		Sediment drying/compaction of exposed sediment may reduce resuspension when subsequently inundated
Connectivity b/t channels and OCAs	■	■		Hydrologic connectivity among aquatic areas is affected by water surface elevation
Water level fluctuations	■	■		Water surface elevation and its variability directly determined by WLM
Flood inundation			■	Duration and extent of floodplain inundation directly determined by WLM.

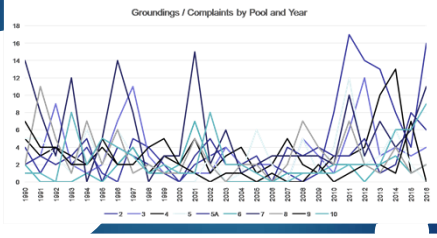
Pool Management is a Skill





Channel Performance

- Number of groundings/complaints per year per pool



Travel times for Moderate flows

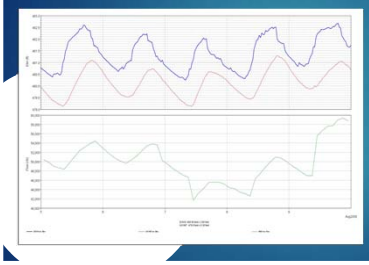
L & D's 2 to 3	8 -12 hours
L & D's 3 to 4	at least a day
L & D's 4 to 5	6-8 hours
L & D's 5 to 5A	4-6 hours
L & D's 5A to 6	4-6 hours
L & D's 6 to 7	6 – 8 hours
L & D's 7 to 8	12 hours
L & D's 8 to 9	16 -20 hours
L & D's 9 to 10	8 - 12 hours

Change in flow for 24 hours to change the pool 0.1 foot

Pool 2 - 1200cfs
Pool3 - 900cfs
Pool 4 – 2000cfs
Pool 5 – 600cfs
Pool 5A – 400cfs
Pool 6 – 300cfs
Pool 7 – 700cfs
Pool 8 – 1200cfs
Pool 9 – 1600cfs
Pool 10 – 1000cfs

L & D's and control points

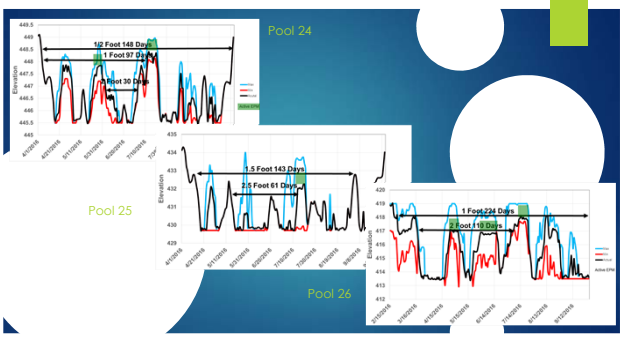
Multi-purpose factors of mgmt…



- Hydropower
- Water supply
- Recreation

Objectives

- 1948 – Anti-Drawdown Law (targeting winter ops)
- 1970s – Direction to limit dredging
- 1995 – St. Paul District WLMTF asks to hold winter water levels high



No Show Stoppers

All you gotta do is ask!

Great Opportunity for Public Engagement

Facilitated Exercise

WHAT: Define the Opportunity or Constraint

WHY: Explain Importance

HOW: List Actions

WHO: Name who does the actions

HOW: Identify what's needed to act

UMRBA: What (if anything) should UMRBA do

Opportunities

- Opportunistic management
- Cost-Benefit analysis
- Pools 13 and 18
- Monitoring/modeling/learning
- Enabling methodologies
- Improving habitat
- Generic
- Public outreach

Constraints

- Policy
- Funding
- Hydrology & hydraulics
- Perceptions
- Risk
- Operational
- Ecological impact

Overarching Needs

Partner communication & communication
- Systemic WLMTF
- Spring 2018 workshop
- Conference calls/webinars

Public outreach and education

The Recommendations

Opportunistic Opportunities

WHAT: Seize opportunities…within operating band

WHY: Ecological benefits at relatively low cost

HOW: Be ready/plan
Monitor biological responses
Engage public
Identify, share, and own the risk

WHO: Federal and state agencies, river teams, NGOs

UMRBA: Engage agency leadership
Develop UMRS pool management manual

Cost-Benefit Analysis

WHAT: Define and quantify trade-offs (across spectrum)

WHY: Validate the additional effort

HOW: Complete a meta-analysis
Define the scope
Perform additional studies of costs and benefits

WHO: Federal and state agencies, river teams, NGOs, universities, contractors

UMRBA: Support and facilitate
Pursue necessary policy changes

Address Policy Limitations

WHAT: Lack of awareness and understanding of limiting policies and how to address them

WHY: Policies seemingly a hold-up, perceived or real

HOW: Gain a comprehensive understanding
Define solutions

WHO: Corps and other federal and state agencies, NGOs

UMRBA: Facilitate dialogue and action

Pools 13 and 18

WHAT: Execute drawdowns and more routine, opportunistic WLM

WHY: High success potential, substantial ecological benefits and learning opportunities

HOW: Just do it! Ask for it
Revisit NESP recommendations
Employ an outreach campaign
Prepare navigation channels

WHO: Corps and other federal and state agencies

UMRBA: Communicate partners' ask
Lead or support public outreach campaign

Funding

WHAT: Associated costs are expensive – e.g., dredging, material placement, monitoring, river training structures

WHY: Costs are a hold up

HOW: Seek and secure necessary funding
Reduce unnecessary costs
Generate public support
Quantify ecological benefits, savings to out year dredging

WHO: Corps, non-federal partners

UMRBA: Communicate partners' ask
Lead or support public outreach campaign
Facilitate discussion among partners

Hydraulics and Hydrology

WHAT: Better understand how H&H affect river management

WHY: Successful implementation depends on H&H conditions
Conditions are changing in ways that may be constraining

HOW: Research water flows from watershed, floodplain, channel
Develop predictive models
Secure public and agency support, funding, expertise

WHO: Partners determine objectives
Corps, USGS, other technical experts develop models, studies

UMRBA: Obtain political support
Facilitate collaboration and information dissemination

Partner Reflections

Workshop Outcomes

Going forward

St. Louis District EPM 2017 Results

Days of Environmental Pool Management			
	LD 24	LD 25	Mel Price
1.0 foot	50	58	83
2.0 foot	31	50	41
Active EPM	16	13	37

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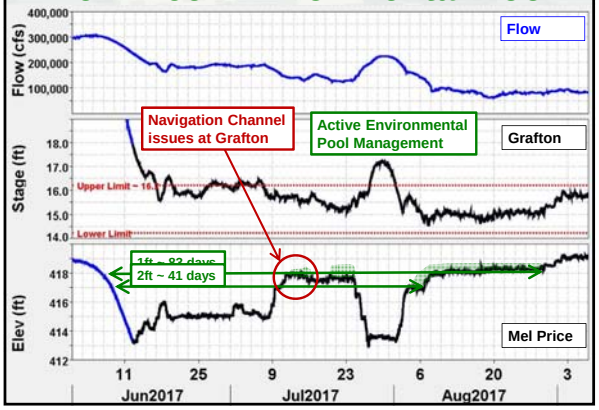
Mel Price Environmental Pool



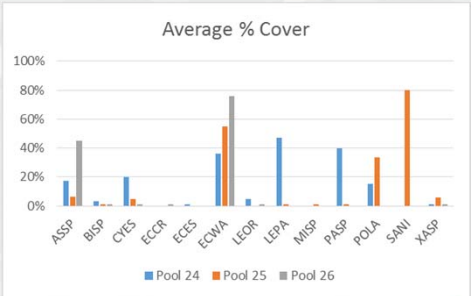
Biological Response

- Vegetation surveys:
  - ▸Integrated Waterbird Management and Monitoring
  - ▸Long-Term Resource Monitoring
  - ▸Transect % cover
  - ▸Seed Head
- Sediment Consolidation
- Least Tern Occurrences

Vegetation Surveys

- Integrated Waterbird Management and Monitoring
- Long-Term Resource Monitoring
- Transect % cover
- Seed Head

Integrated Waterbird Management & Monitoring



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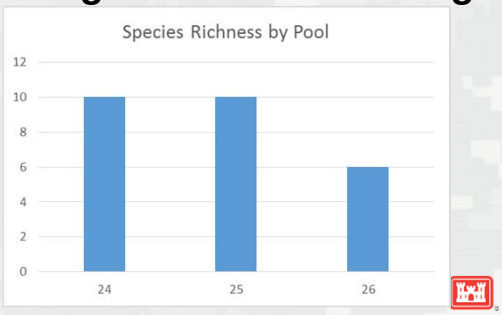
Integrated Waterbird Management & Monitoring



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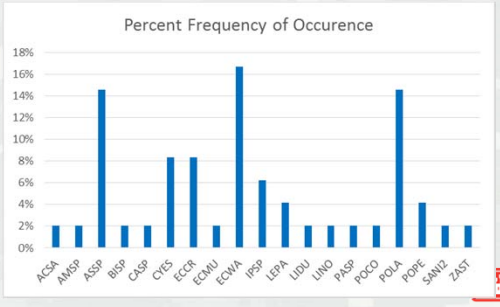
Long-Term Resource Monitoring – Pool 26



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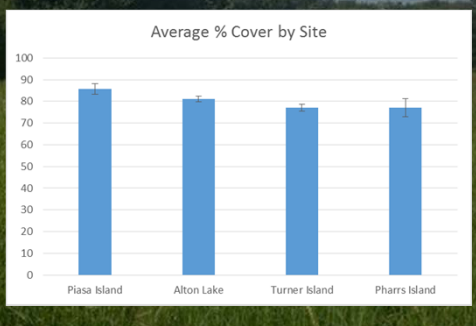
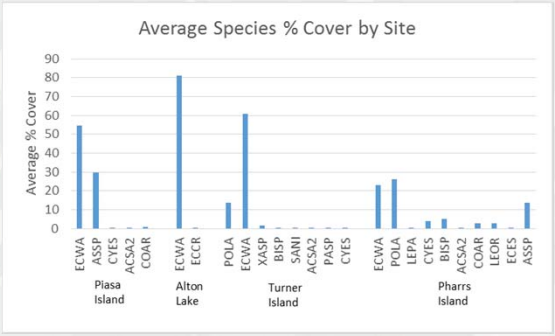
Transect Surveys



Transect Surveys



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Seed Production

Seed Production

	Pool 26	Pool 25	Pool 24	TOTAL
Acres	753.57	519.00	338.77	**1,611.34**
lbs Seed	879,416.19	853,391.70	424,173.92	**2,156,981.81**
Avg lbs Seed/Ac	1,167.00	1,644.30	1,252.10	**1354.46**
Duck Energy Days (DEDs)	3,481,920.00	2,875,800.00	1,767,720.00	**8,125,440.00**
DEDs for 60 Days	58,032.00	47,930.00	29,462.00	**135,424.00**

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Sediment Consolidation

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Floating Leaf Aquatics

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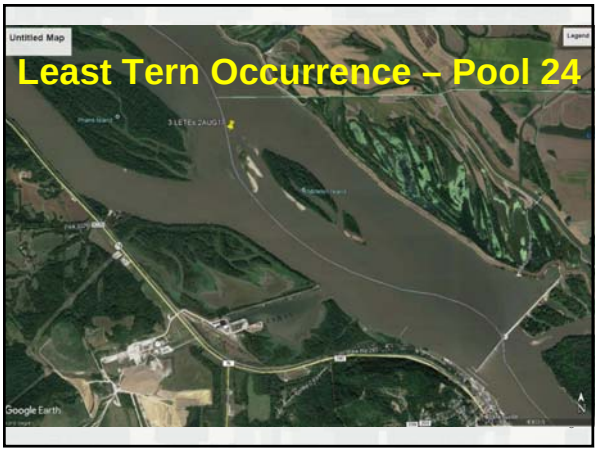
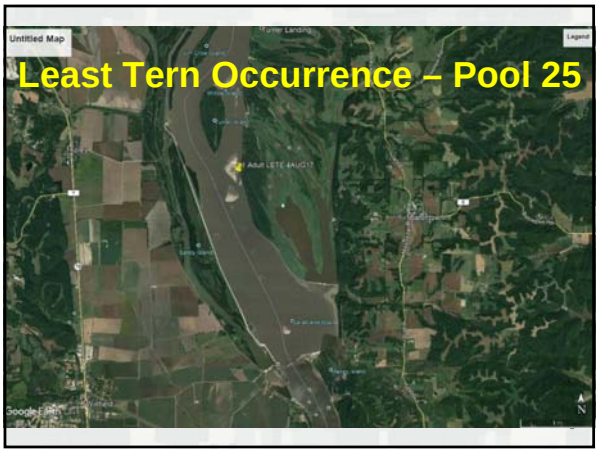
Perennial Response

Least Tern Occurrence – Pool 24



Least Tern Occurrence – Pool 25



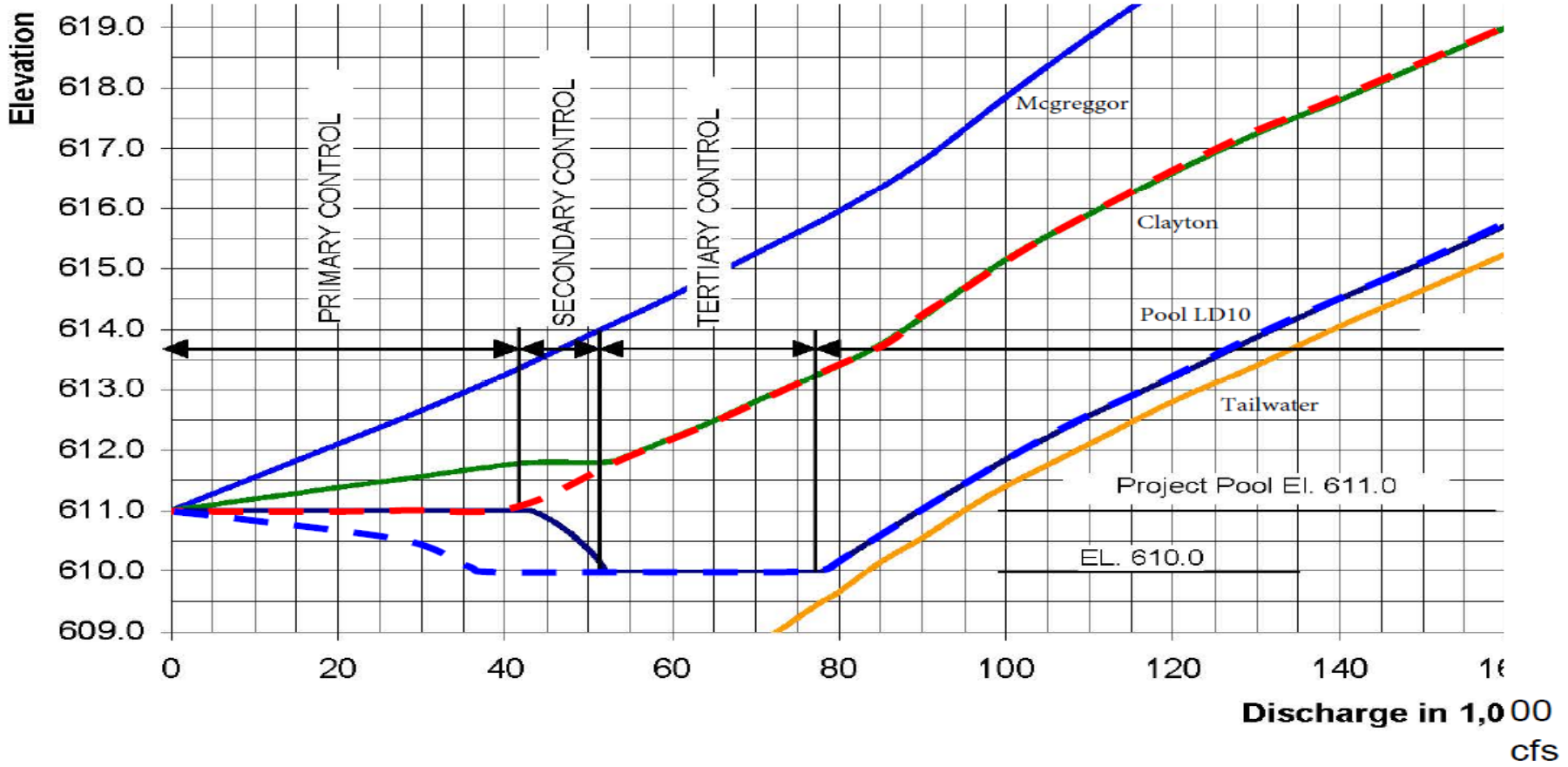
Questions???

Daniel Fasching 1/23/2018

UMRBA Opportunistic drawdown **DRAFT**

The following figures are to help in the consideration of an Opportunistic Drawdown (ODD) in pool 10. Observed pool 10 elevational data was collected (MSL 1912 datum) and summated in the following ways.

It was determined that an ODD in pool 10 is feasible only for flows between 30,000 cfs and 55,000 cfs. The following graphic shows the ODD regulation curve in dotted lines and current regulation curve in solid lines. Keep in mind this figure is a rough estimation and does not reflect actual guide curves for the ODD elevations.



Daniel Fasching 1/23/2018

UMRBA Opportunistic drawdown **DRAFT**

To better depict the range of flow over a long period the following hydrograph was produced for the last 10 years. Any period where the blue flow line is in-between the two dotted lines ODD regulation is possible.