DRAFT - WALLA WALLA BASIN INTEGRATED FLOW ENHANCEMENT STUDY	
PRELIMINARY PROJECT PROPOSAL TEMPLATE	
1. Title: **MAR Model Scenario: 7x MAR & 50 cfs bypass Flows (see attached journal article)**	**2. Proposal Preparer(s):** **Steven Patten**
3. Project Status: *Identify whether the proposed project is a past, ongoing or new project and briefly explain the status of the project, including the requested role of the Flow Study in further consideration of the project. If past project, some of the questions below may not be applicable.*	
□ a. NEW PROJECT **X** b. ON-GOING PROJECT **X** c. PAST PROJECT **X** d. Modeled Project	
4. General Description of Proposal: *Identify the category(s) and briefly explain the proposed project (e.g. location, infrastructure requirements, maintenance requirements, connection to other new, ongoing or past projects, other stakeholders, various sizing or phasing, etc.).*	
X a. Water Conservation & Infrastructure **X** b. Aquifer Recharge & Aquifer Storage and Recovery **X** c. Surface – Groundwater Source Switch d. Surface Water Storage □ e. Pump Exchange □ f. Water Right Transactions □ g. Point of Diversion Transfers □ h. Other This project proposal evaluation is for a source switch scenario to increase instream flows in the Walla Walla River. MAR was increased to 7x that of 2013 operations and bypass flows were doubled to 50 cfs at diversion locations. This scenario includes 15 MAR sites. Total MAR volume applied each year was estimated at ~30,800 acre-feet. The information to complete this evaluation was taken from a published article (attached) utilizing the IWFM Groundwater/Surface Water model for the Walla Walla Basin. Water rates and volumes are calculated by comparing the 7xMAR/High WWR to the Status Quo scenario.	
5. Source of Produced Water: *Mark all applicable and identify (water right number, shallow or deep basalt aquifer, stream name).*	
X a. Existing Water Right –new Limited License 1621 and likely additional LL (water rights that allow MAR in Oregon), LWP 10-02, LWP 14-01, LWP 14-02, SLP 17-02 and S3-30680 (EEP Temporary Permit for Stiller Pond). Potential need for additional WA water rights to meet modeled MAR volumes. **X** b. Groundwater – Increased alluvial (shallow) groundwater levels due to MAR operations. Groundwater is used to meet agriculture demand because additional water is left instream. The model utilizes the available surface water (after meeting the 50 cfs bypass) and after it has been utilizied switched to alluvial groundwater to meet crop demands. **X** c. Surface Water – Bypass flows at diversions is increased to 50 cfs. Increased surface water flow during low flow periods due to increased groundwater returns and reduced seepage loss for most surface water bodies, however some do show a decline during summer months (West Little Walla Walla River – see table 2 in article). Water for MAR sites is withdrawn from the Walla Walla River during November-May assuming minimum instream flows are met. □ d. Other	

6. Quantity/Timing/Location of Produced Water Instream: *Estimate average amount of water, when and where. Can project be considered at various sizes(flow outputs) and/or considered in phases?*

a. Acre-feet and/or Cubic-feet-per-second:

Mean annual flow in the Walla Walla River increases from 24.47 cfs (Status Quo scenario) to 45.77 cfs (7xMAR/HighWWR scenario). Also, the 7xMAR/High WWR scenario predicts no days with flow in the WWR below ~30 cfs where the Status Quo has 11 days a year of less than 30 cfs. Spring branch systems also show increased mean annual flow (WLWWR, Mud Creek and Big Springs).

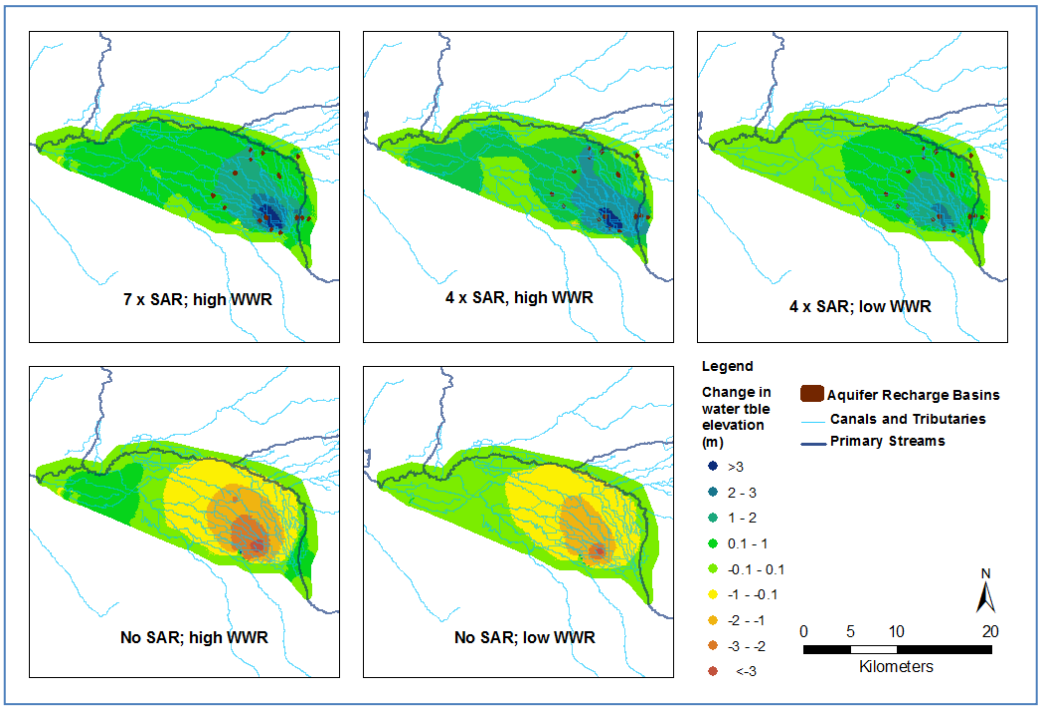

Figure 1. The Difference in groundwater head resulting from 10 year simulationi under scenario conditions compared to continuing current management practices (Status Quo scenario)

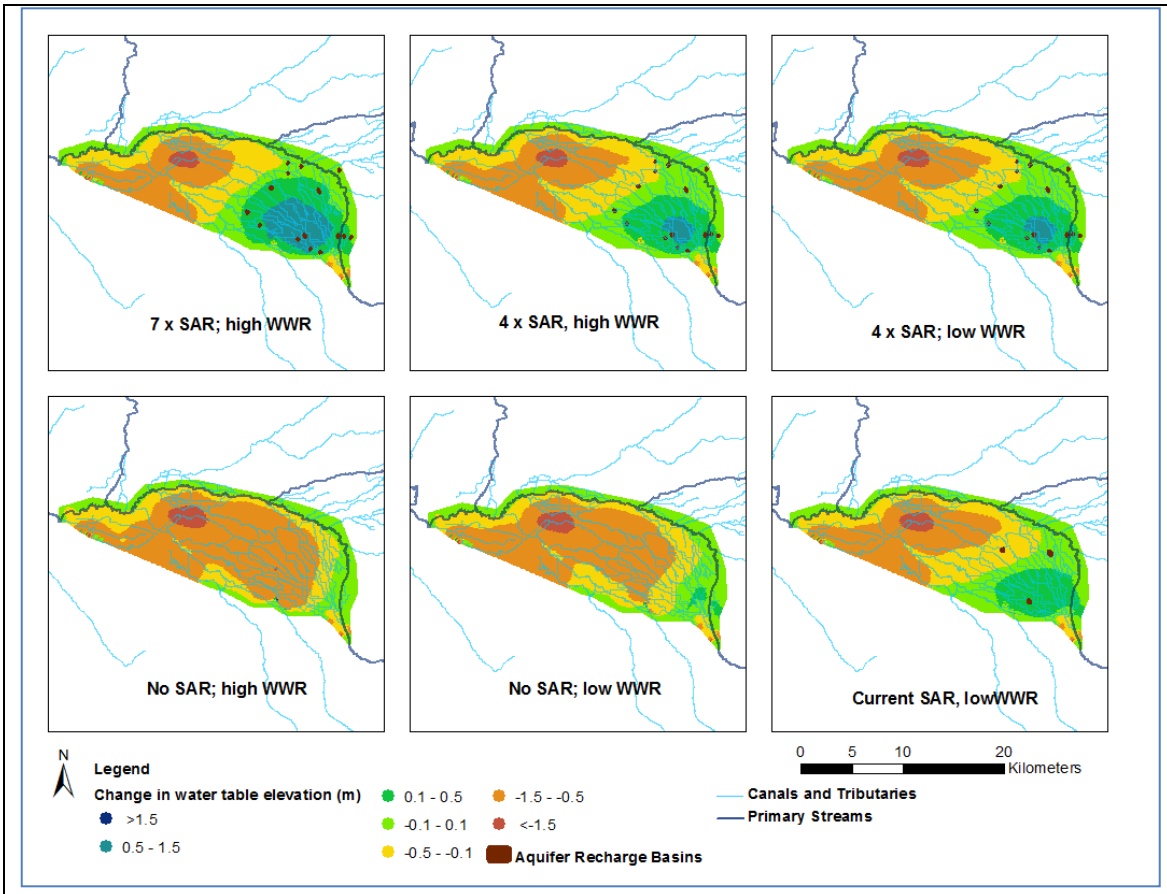

Figure 2 – The predicted change in water level elevation in the model area after 10 year simulation under different management scenarios.

b. Timeframe(s):

In this scenario, the bypass flows are increased to 50 cfs year round. Annual mean stream flow is 45.77 cfs for the Walla Walla River.

c. Stream Reach Location(s):

Impacts Walla Walla River stream reaches downstream of Milton-Freewater. Also benefits most spring branch systems (at least during portions of the year).

d. UNKNOWN -

Numbers are based upon model scenario.

7. Ability to Protect Produced Water Instream: *Briefly explain how the produced water will be quantified, monitored and protected instream or why it is not currently protectable.*

□ a. YES

□ b. NO

X c. UNKNOWN - As this would be a source switch, it likely could be protected in each state. There could be problem with protecting it across the stateline (as is true for most projects currently). Exact protection mechanisms would have to be discussed with both WA and OR.

8. Cost Estimates: *Provide known and estimated costs to develop and implement the project.*

a. Project Development and Design:
MAR site development and design = ~$10,000/per site

b. Project Construction:
Typical Oregon Aquifer MAR site: ~$40,000-$50,000 (includes monitoring well)
Typical Washington MAR site: ~$100,000-$150,000 (includes 3-5 monitoring wells & SW gauges)

7x Current MAR scenario costs = ~$3,100,000 to 5,114,000

Production well (alluvial) ~$50,000 each (if needed)

c. Construction cost per AF and/or CFS:
AF/year = ~30,800 acre-feet (includes both OR and WA sites)
CFS = 50 cfs bypass at diversions (25 cfs from this project)
Cost/AF = ($5,114,000 construction costs + $50,000,000 50 yrs O&M = $55,114,000 divided by 1,540,000 50 yrs acre-feet =) **$35.79**
Cost/CFS = ($5,114,000 construction costs divided by 25 cfs =) **$204,560/CFS**

Water Diversions:
Oregon sites = ~72 cfs to operate all 5 sites at maximum capacity from Nov 1 to May 15th (assuming instream flows are being met).
Washington sites = ~20 cfs to operate both sites at maximum capacity from Dec-May (assuming instream flows are being met).

d. Project Annual O&M:
Annual O&M for Current MAR sites = ~$350,000 to 740,000 (OR = ~$50,000 and WA = ~$300,000 to 690,000)

Additional pumping costs for GW sources = ~$65,000/month. Assuming 4 months of pumping annual O&M = $260,000

□ e. UNKNOWN

9. Secured Costs: *Has any funding been secured in the past or currently and what is source?*

Funding for the first ~20 sites has been secured, remaining sites to reach the 30,800 AF target would need to be funded. Funding was provided by WA Dept of Ecology, Oregon Watershed Enhancement Board, Bonneville Power Administration, NRCS, Walla Walla Alliance, BOR and HBDIC (in-kind for operations).

No secured funding to pay for increased GW pumping costs or additional production wells if needed.

10. Other Potential Project Advantages: *In addition to helping address flow targets and basin-wide flow issues (Endangered Species Act, Tribal Water Rights, Clean Water Act, etc.), briefly explain other potential benefits (e.g. reduced O&M costs, restores/mimics ecological processes, cropping flexibility,)*

- Provides additional winter/spring time habitat for water fowl (infiltration basin).
- Clean Water Act, MAR water cools down-gradient surface water bodies.
- Potential to reduce O&M costs over time based upon results and rolling monitoring into a programmatic approach
- Mimics floodplain processes in constrained alluvial fans systems (WWR and Mill Creek)

11. Other Potential Project Disadvantages: *Briefly explain potential drawbacks of the proposal (e.g. reduced GW supply - recharge mitigation need, increased O&M costs, legal implications)*

- MAR return flows, as currently operated, cannot be protected.
- Potential competition for winter/spring water supply (Reservoir, etc).
- Not every farmer has an existing well to allow for a source switch

12. Estimated Time Frame to Implement Project?

2025+ to build additional recharge sites and to establish source switch process/funding. Additional production wells may have to be drilled.