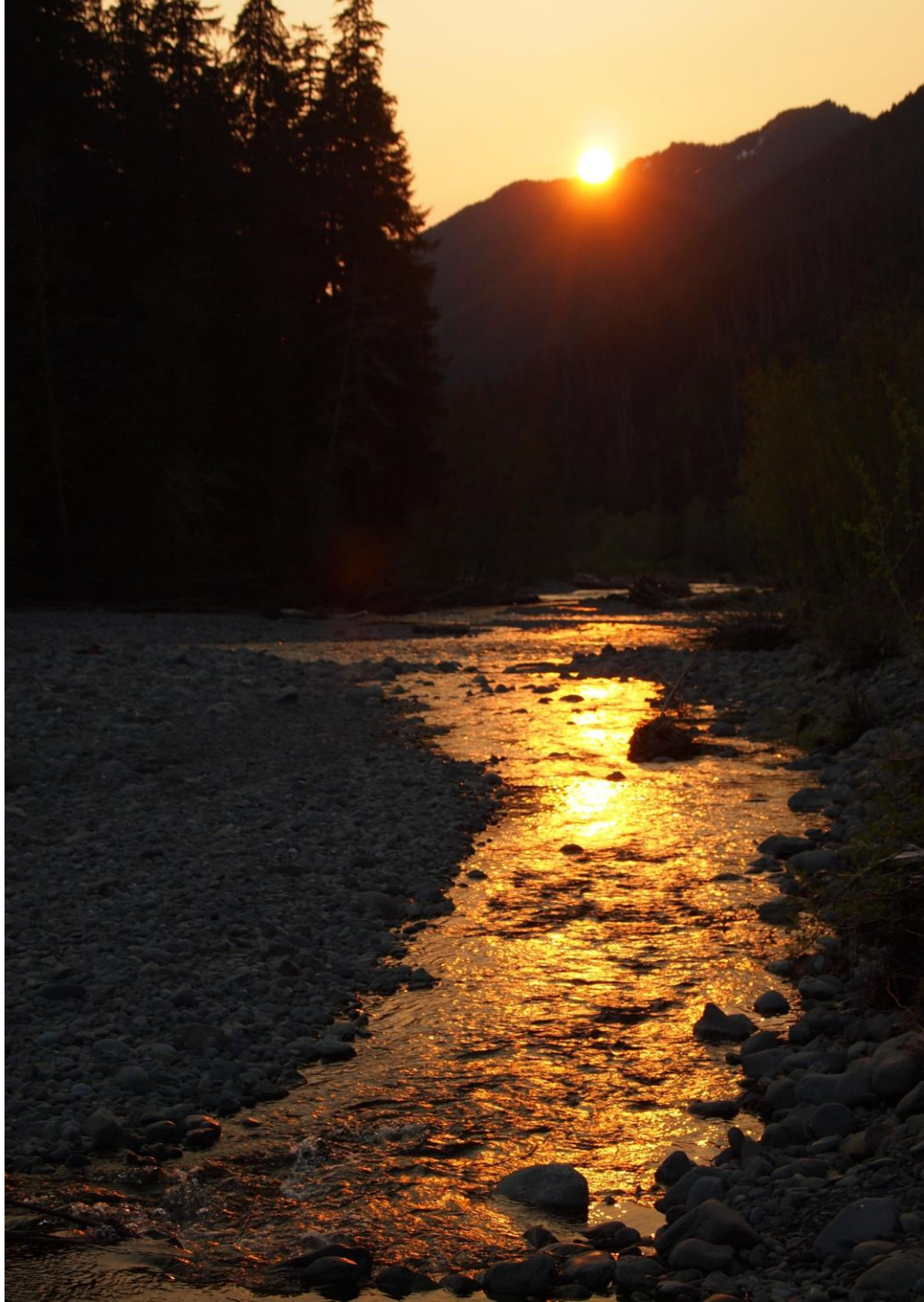
# Water Retention:

## Opportunities for the Methow Valley



Methow Watershed Council

25th Feb 2026

- Context
- Retention Options
- Retention Comparison – Pros & Cons
- Council Priorities
- How the Council could engage
- References

*Summarize the major potential water retention opportunities* and identify the approaches that could be the best fit for our watershed*

** Water Retention Strategies: Approaches for the Methow Valley 2025, Methow Basin Storage Assessment 2003, LTPBR Science report 2024 and Watershed restoration Methow Okanogan Beaver Project*

# Context

- **Hydrologic Challenges**
  - Winter precipitation shifting from snow → rain
  - Peak runoff occurring earlier
  - Lower summer flows, higher winter flows
  - More extreme wet and dry events

- **Storage Opportunity**
  - 1 million acre-feet leave the basin annually
  - Some portion could be stored or retimed
  - Benefits: irrigation, habitat, recreation, firefighting, domestic supply
  - A range of options exist but there is no single quick fix for water retention

# Major Water Retention Options

| Option | Strategy |
|---|---|
| 1. Seepage from Open Canals | Use intentional leakage from unlined irrigation canals to recharge aquifers |
| 2. Artificial Aquifer Recharge (ASR & MAR) | Store high-flow water underground for later release or ecological benefit |
| 3. Twin Lakes Aquifer Coalition Project | Restore declining Twin Lakes water levels and associated aquifer by adding a new water source |
| 4. Reservoir Strategies | Increase or modify above-ground storage. |
| 5. Habitat Restoration & Enhancement | Improve natural hydrologic function by reconnecting rivers with floodplains and slowing water. |
| 6. Low-Tech Process-Based Restoration (LTPBR) | Slow flows, increases groundwater recharge, improves biodiversity |
| 7. Micro-Scale Water Retention | Rainwater harvesting, Permaculture-based soil moisture retention |

# Major Water Retention Options – *Pros & Cons*

| Option | Pros | Cons |
|---|---|---|
| **1/** Seepage from Open Canals | **Provides delayed groundwater recharge** that naturally augments late-season flows.<br>**Low infrastructure cost** compared to engineered recharge.<br>**Historically significant contributor** to basin-wide recharge (nearly 10% of non-fluvial recharge).<br>Can be **seasonally targeted** (e.g., pre-irrigation season diversions). | **Piping eliminates seepage**, reducing natural recharge. (half of canals have been piped)<br>**Operationally difficult** to divert water early in the season (snow, ice, access).<br>**Regulatory barriers**—diverting water outside irrigation season<br>Recharge is **diffuse and hard to quantify**, making it difficult to use for mitigation. |
| **2/** Artificial Aquifer Recharge (ASR & MAR) | **Highly scalable**—can store large volumes (e.g., 1,500+ acre-feet in the Twisp MAR example).<br>**Direct, measurable streamflow benefits** (e.g., modeled 6.5 cfs summer/fall augmentation).<br>**Improves water temperature** by returning cool groundwater to the river.<br>**Supports municipal water rights mitigation** (e.g., Twisp's proposed 1 cfs).<br>**Climate-resilient**—captures increasing winter flows and shifts them to summer.<br>**Can be sited strategically** based on hydrogeology. | **High cost** (Twisp MAR: ~$8.5M for feasibility + construction).<br>**Complex permitting** (water rights, shoreline, SEPA, cultural resources, etc.).<br>**Requires extensive site characterization** (borings, infiltration tests, modeling).<br>**Long lead time**—multi-year feasibility + design + construction.<br>**Potential water-quality constraints** (must meet groundwater and surface standards).<br>**Ongoing O&M** required to maintain infiltration efficiency |

# Major Water Retention Options – *Pros & Cons*

| Option | Pros | Cons |
|---|---|---|
| **3/** Twin Lakes Aquifer Coalition Project | Addresses **documented aquifer decline** (>15 ft drop). Could **restore lake levels**, benefiting habitat and recreation.<br>**Supports domestic water supply** through retiming of withdrawals.<br>Potential **synergy with local housing development** (Sunny M parcel). | **Source water options limited**; each has tradeoffs (well vs. creek vs. Patterson system).<br>**Infrastructure costs** still significant.<br>**Uncertain recharge efficiency** depending on chosen source.<br>**Governance complexity**—multiple landowners and stakeholders |
| **4/** Reservoir Strategies | **Familiar, proven technology** with predictable storage.<br>**Operational tweaks** (e.g., Pearrygin Lake) can yield modest municipal benefits.<br>Can provide **multi-benefit storage** (recreation, fire suppression, irrigation). | **New large dams are politically and environmentally infeasible**.<br>**High capital cost** for expansions or new construction.<br>**Limited suitable sites** in the Methow (5,000ac-ft from 4 main sites)<br>**Evaporation losses** reduce effective storage.<br>Often **conflicts with recreation and habitat values**. |
| **5/** Habitat Restoration & Enhancement | **Restores natural hydrologic function**—slows water, increases infiltration.<br>**Improves habitat** for ESA-listed species.<br>**Distributed benefits** across the watershed.<br>**Lower cost per project** compared to MAR.<br>**Long-term resilience** once vegetation and geomorphic processes re-establish. | **Benefits are diffuse and hard to quantify** in acre-feet or cfs.<br>**Requires large spatial footprint** for meaningful hydrologic impact.<br>**Permitting and landowner coordination** can be complex.<br>**Takes years** for full ecological and hydrologic benefits to materialize. |

# Major Water Retention Options – *Pros & Cons*

| Option | Pros | Cons |
|---|---|---|
| **6/** Low-Tech Process-Based Restoration (LTPBR) | **Very cost-effective** relative to engineered solutions.<br>**Rapid ecological response** in small tributaries.<br>**Increases groundwater storage** by raising water tables.<br>**Highly scalable** across many small streams.<br>**Community-friendly**—often volunteer-supported | **Small per-site storage**; requires many installations for basin-scale impact.<br>**Maintenance required**—structures can blow out in high flows.<br>**Limited to specific geomorphic settings** (small, low-gradient channels).<br>**Not suitable for municipal mitigation** due to uncertain quantification. |
| **7/** Micro-Scale Water Retention | **Low cost**, easy to implement.<br>**Builds community engagement** in water stewardship.<br>**Improves soil health** and drought resilience.<br>Works well for **fire-adapted landscaping** and small farms. | **Minimal basin-wide impact**—not a substitute for large-scale storage.<br>**Highly variable** depending on landowner participation.<br>**No direct streamflow benefit** unless aggregated at scale. |

# Water Retention Initiatives Comparison

| Strategy | Cost | Feasibility | Hydrologic Benefit | Legal / Reg Viability | Time Horizon |
|---|---|---|---|---|---|
| **1. Open Canal Seepage** | **Low** | **Medium** (limited sites) | **Medium** | **Medium–Low** (regulatory hurdles) | **Short** (1–3 yrs) |
| **2. Artificial Aquifer Recharge** | **High** | **Medium** (site-dependent) | **High** (quantifiable, scalable) | **High** (strong agency support) | **Long** (5–10 yrs) |
| **3. Twin Lakes Aquifer Project** | **Medium** | **Medium** | **Medium** | **Medium–High** | **Medium** (3–7 yrs) |
| **4. Reservoir Strategies** | **Medium–High** | **Low–Medium** | **Medium** | **Low** (new dams infeasible) | **Long** (5–15 yrs) |
| **5. Habitat Restoration** | **Medium** | **High** | **Medium** (diffuse but real) | **High** | **Medium–Long** (3–10 yrs) |
| **6. LTPBR** | **Low** | **High** | **Low–Medium** (site-scale) | **High** | **Short–Medium** (1–5 yrs) |
| **7. Micro-Scale Retention** | **Low** | **High** | **Low** | **High** | **Short** (0–2 yrs) |

# Methow Watershed Council Priorities

**Tier 1 — High-Impact, High-Feasibility**
- Low-Tech Process-Based Restoration (BDAs, PALS, Zeedyk)
- Habitat restoration (ELJs, side channels, floodplain reconnection)
- Micro-scale retention (community-level soil moisture, rainwater harvesting)

**Tier 2 — Strategic, Scalable Storage**
- Managed Aquifer Recharge (MAR) / Aquifer Storage & Recovery (ASR)
- Twin Lakes Aquifer Coalition Project

**Tier 3 — Opportunistic**
- Open canal seepage (intentional recharge)
- Reservoir operational tweaks (e.g., Pearrygin Lake)

For review and discussion

# How the Council Could Engage

- Convening interested parties to discuss techniques, tools, and opportunities for working at the landscape scale to meet the region's water needs
- Hosting and/or participating in field trips to visit and learn about local habitat restoration and enhancement project
- Providing a forum for discussion of potential projects—for instance, during occasional MWC roundtables or in public presentations
- Including articles about restoration projects, methods, and initiatives in the MWC newsletter

Consider how we should incorporate initiatives into our workplans

# References


- Water Retention Strategies: Approaches for the Methow Valley 2025
- Methow Basin Storage Assessment 2003
- LTPBR-Science-Report-Version 2024
- Watershed Restoration – Methow Beaver Project
- Town of Twisp Methow Basin (WRIA 48) Managed Aquifer Recharge Project