Managed Aquifer Recharge

MAR ESSENTIALS

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Presentation Outline

Overview of Managed Aquifer Recharge (MAR)

Establishing MAR Schemes
- A staged, risk-management approach

Technical Considerations for Successful Implementation
(Russell Martin)

Beenyup Leederville Recharge Bore
Image courtesy of Water Corporation


MAR – An Overview
BRIEF INTRODUCTORY DESCRIPTION
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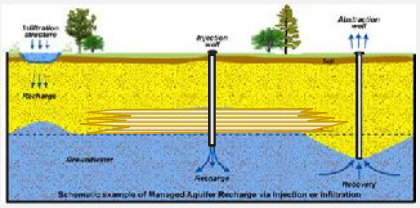
Managed Aquifer Recharge (MAR)

The purposeful recharge of water to the groundwater system for subsequent recovery or environmental benefit.



Source: Department of Water website (modified)

Augment water supplies:
- Drinking water supplies
- Fit for purpose supplies (irrigation, third pipe)

Environmental benefit
- Maintaining water levels (lakes, GDE's)
- Mitigate saline intrusion (coastal bores)
- Net no-loss to aquifer (geothermal)

Re-inject excess water
- Mine dewatering
- Construction dewatering

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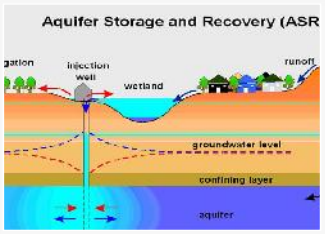
Recharge Methods

Infiltration

- Unconfined aquifer
- Sufficient surface area
- Low/Med. tech
- Passive



Injection Bore

- Confined aquifer
- Limited surface area
- Med/High Tech
- Controlled
- Large volumes
- Recover from same bore (ASR)
- Recover from distant bore (ASTR)

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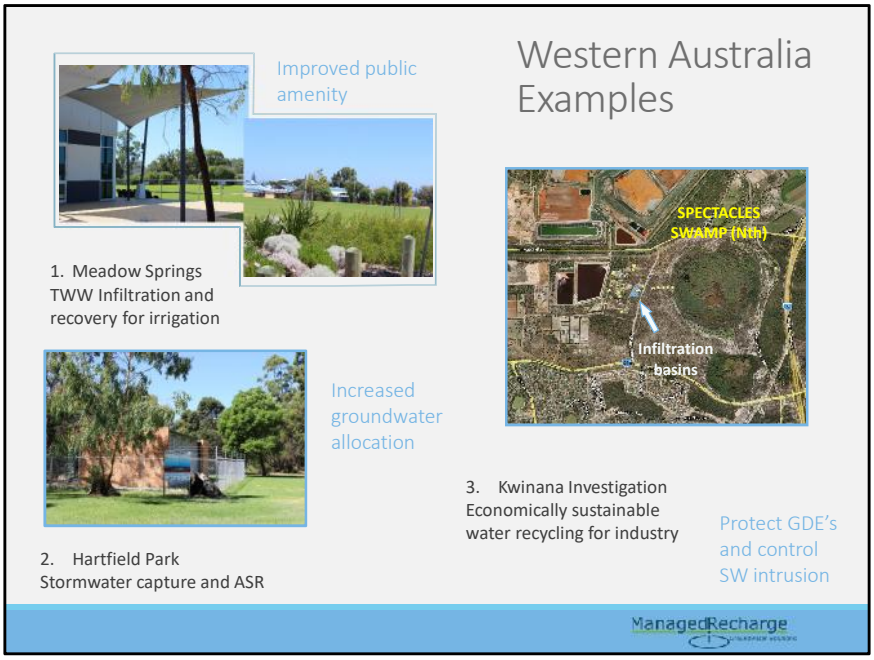
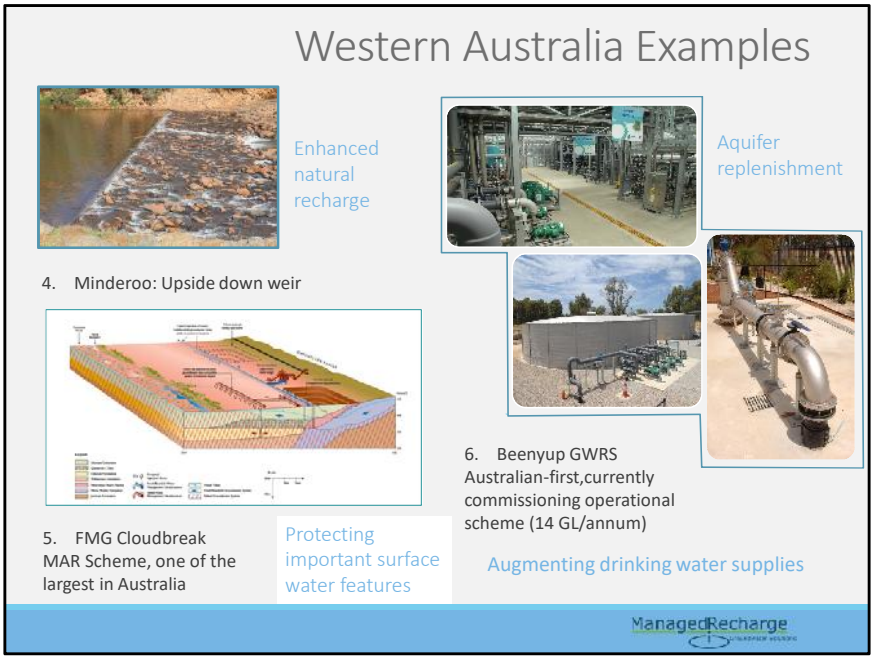


Examples will be discussed in detail in the MAR Essentials workshop:



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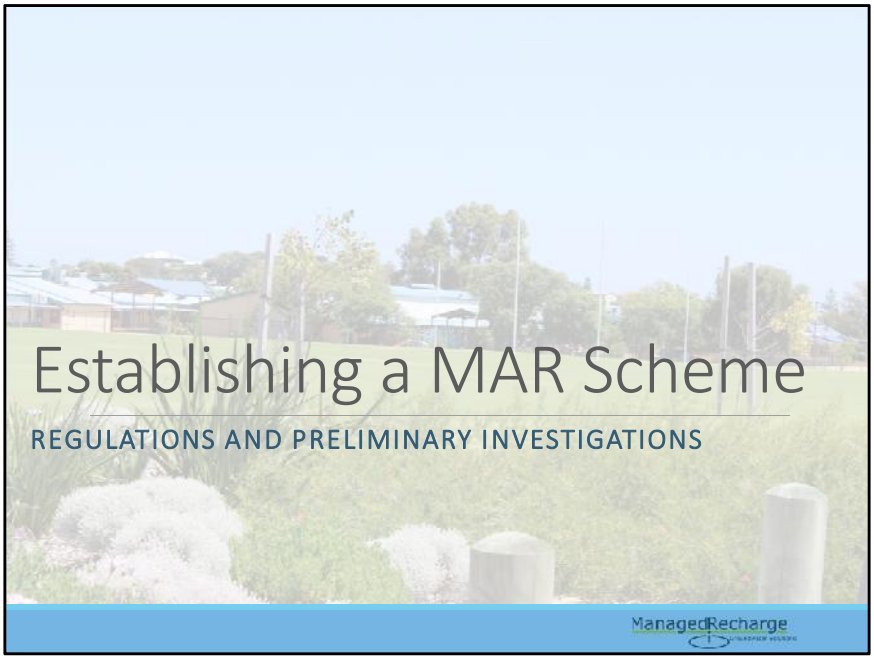
Establishing a MAR Scheme
REGULATIONS AND PRELIMINARY INVESTIGATIONS
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Regulations in Western Australia

Department of Water (DoW):

- Operational Policy 1.01 – Managed Aquifer Recharge in Western Australia, 2011

Department of Environmental Regulation (DER) and Environmental Protection Agency (EPA):

- Contaminated Sites
- Mining
- Modifying lakes or environmental impact

Department of Health

- Recycled water as a source

Operational Policy 1.01 – MAR in WA

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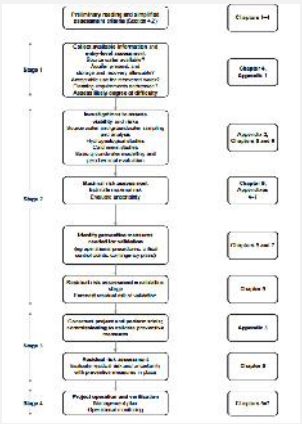
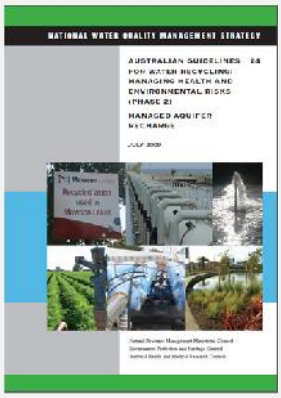
The regulatory environment is currently under review following the recent amalgamation of a number of departments – but historically this is the regulatory environment under which MAR operates in WA.

Australian MAR Guidelines

A systematic, risk-management approach

Stages of Project Development and Assessment





Australian MAR Guidelines (2009)

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Western Australian policy references the Australian Guidelines for Managed Aquifer Recharge, and uses it as an overarching document, providing a template for the approvals process within the WA licensing perspective.

Provides a systematic, staged approach to the assessment and development process.

The guidelines provide more certainty to risk assessments used in the project approvals and speed up the approval process, as well as helping to prevent failures in MAR projects, thereby upholding the confidence of investors and the public in future innovations.

Stage 1 – Desktop Study

High level viability assessment using available information and data

- Identified need/benefit
- Source water available
- Suitable aquifer present
- Acceptable use for recovered water
- Regulatory approval
- Planning requirements identified
- Information gaps?

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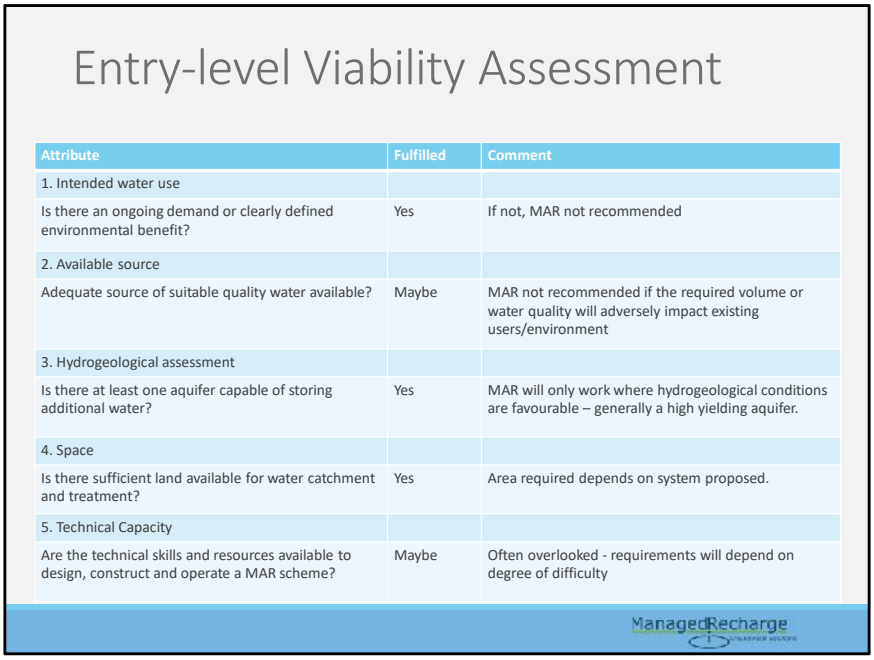
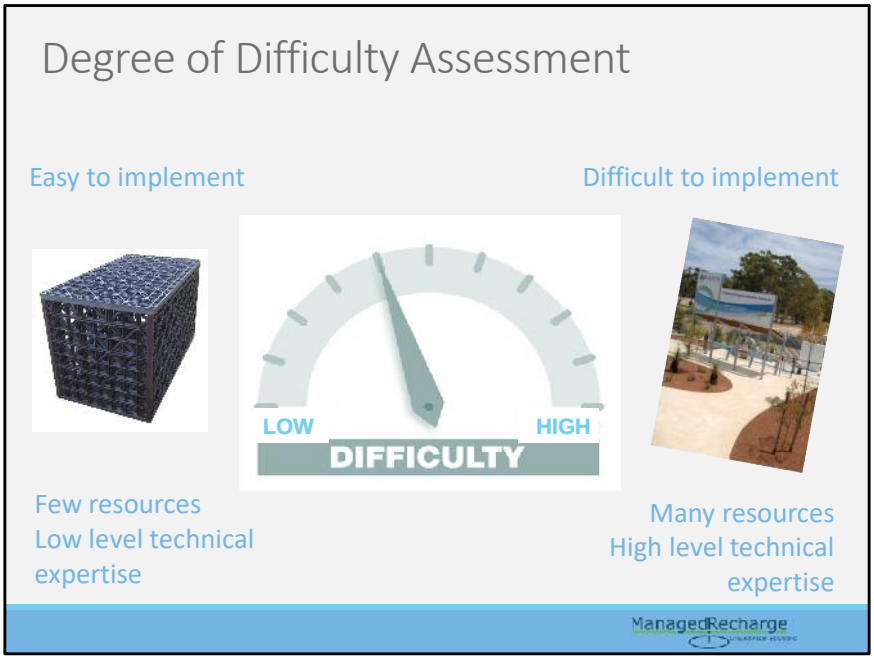
Determine the extent of work needed for the project's success

Identify knowledge gaps and potential technical and economic risks



In the MAR Essentials workshop we will take you through the process of an entry level viability assessment, highlighting factors that need to be considered, such as:

- The intended use
- Availability and quality of source water
- Hydrogeological conditions
- Technical capacity
- Groundwater quality and recovery efficiency
- Geochemical reactions
- Clogging risk
- Proximity of connected ecosystems, and
- Planning requirements



Provides an early indication of the degree of difficulty that might be expected in a project, and allows informed decisions to be made with regard to level of commitment for further investigations and on-going financial and human resources.


Stages 2 to 4
INVESTIGATIONS, TECHNICAL CONSIDERATIONS, DETAILED RISK ASSESSMENT, CONSTRUCTION AND COMMISSIONING
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