Overview of IPR/DPR Expert Panel's DPR Briefing Paper Topics

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DDW-DPR Advisory Group Meeting

Topics Covered

- ***Indirect vs Direct Potable Reuse (DPR)***
- ***Panel Charge – DPR***
- ***Approach - Briefing Topics & Feasibility Report***
- ***Schedule***
- ***Opportunity for Input***

Indirect vs. Direct Potable Reuse

- ***Indirect potable reuse (IPR)*:**
  - **Augmentation of a drinking water source (surface water or groundwater) with reclaimed water followed by an environmental buffer that precedes normal drinking water treatment (working)**
- ***Direct potable reuse (DPR)*:**
  - **Introduction of reclaimed water directly into a potable water supply distribution system downstream of a water treatment plant or into the raw water supply immediately upstream of a water treatment plant (per CWC)**

Indirect Potable Reuse
- Surface Water Augmentation -

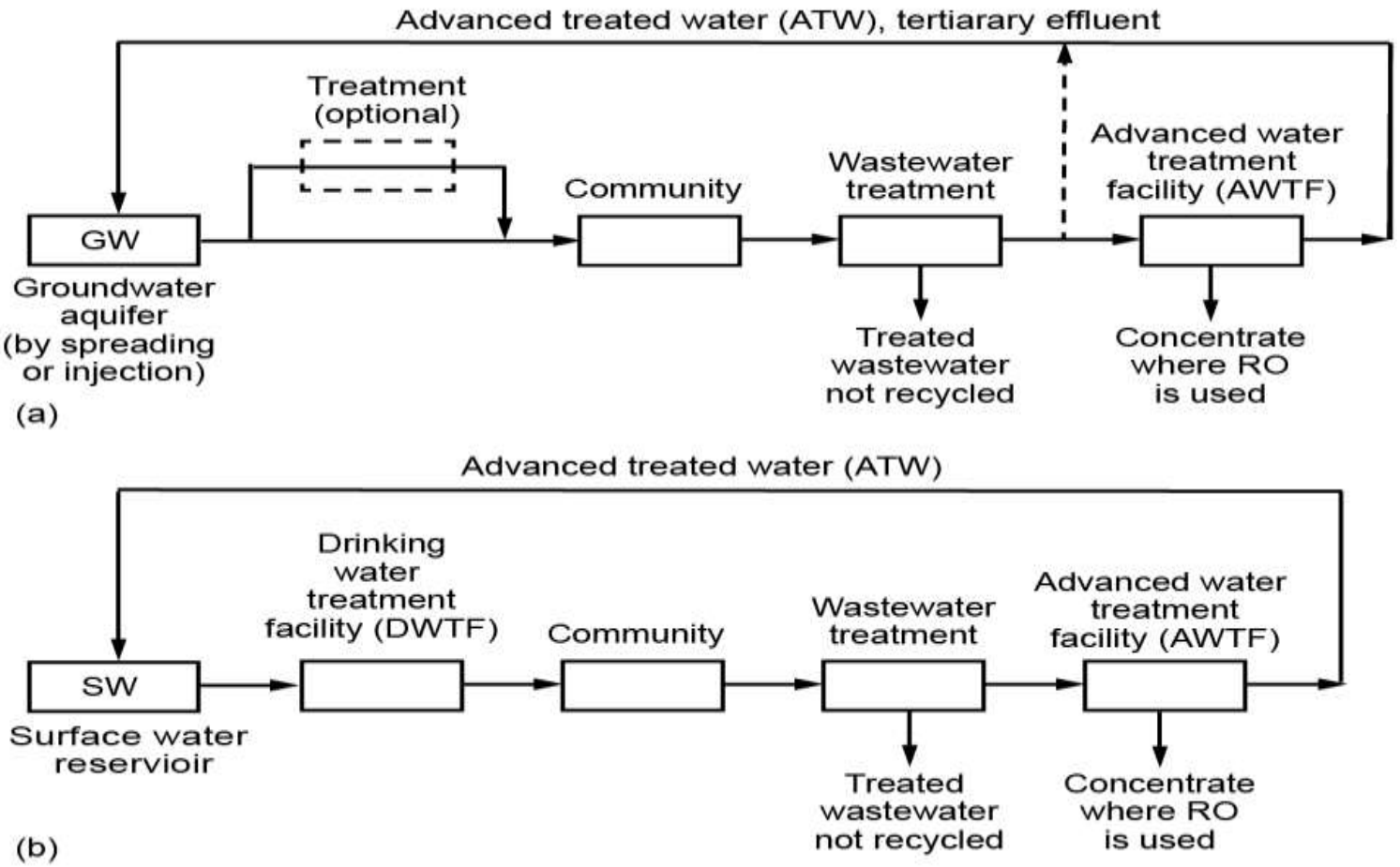
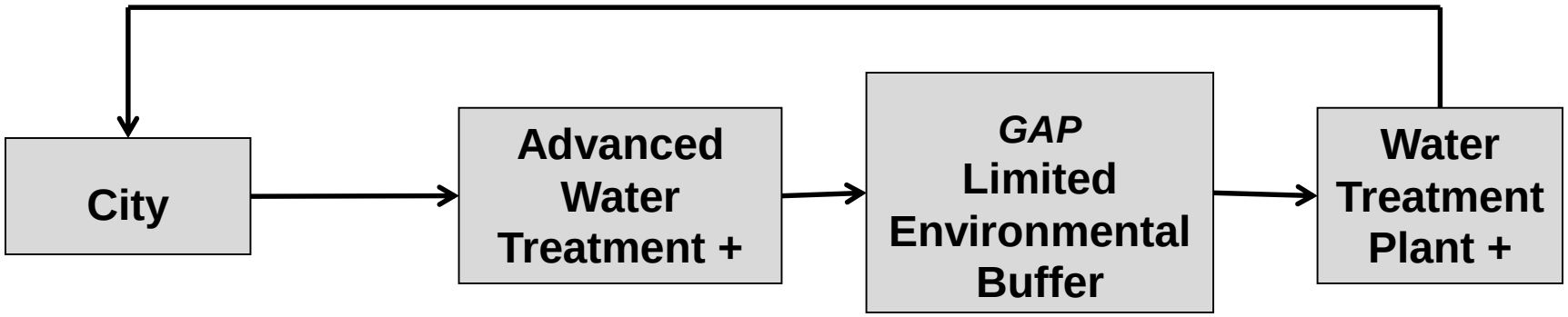


Figure 1. Flow diagrams for IPR: (a) with a groundwater aquifer as an environmental buffer; and (b) with a surface water reservoir as an environmental buffer (Tchobanoglous et al., 2015).

Potable Reuse
- Mind the Gap -



*** Draft DDW regulations currently require primary and secondary treatment, microfiltration, reverse osmosis, advanced oxidation (e.g., H_2O_2/UV), disinfection, and stabilization.**

Direct Potable Reuse

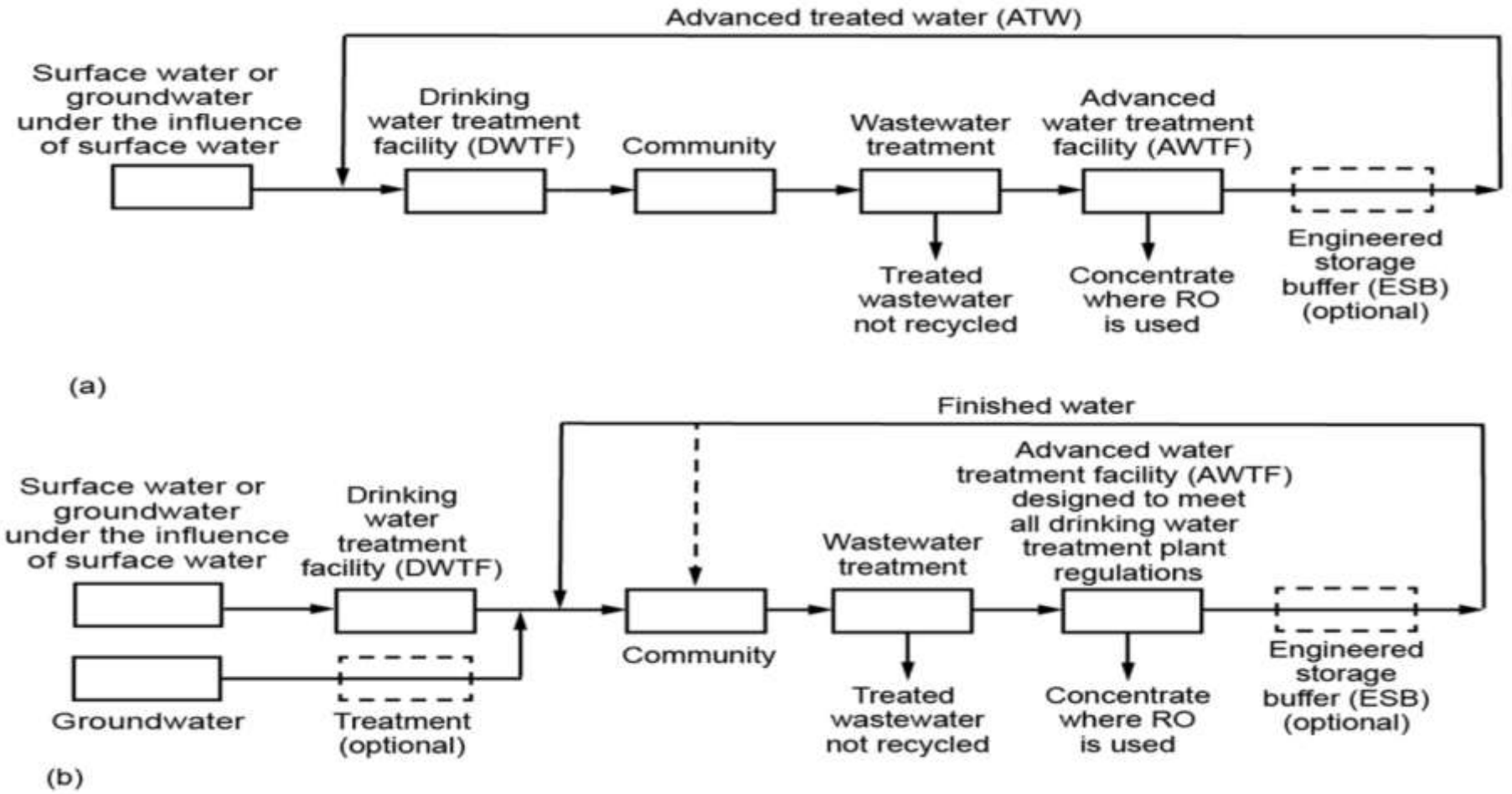
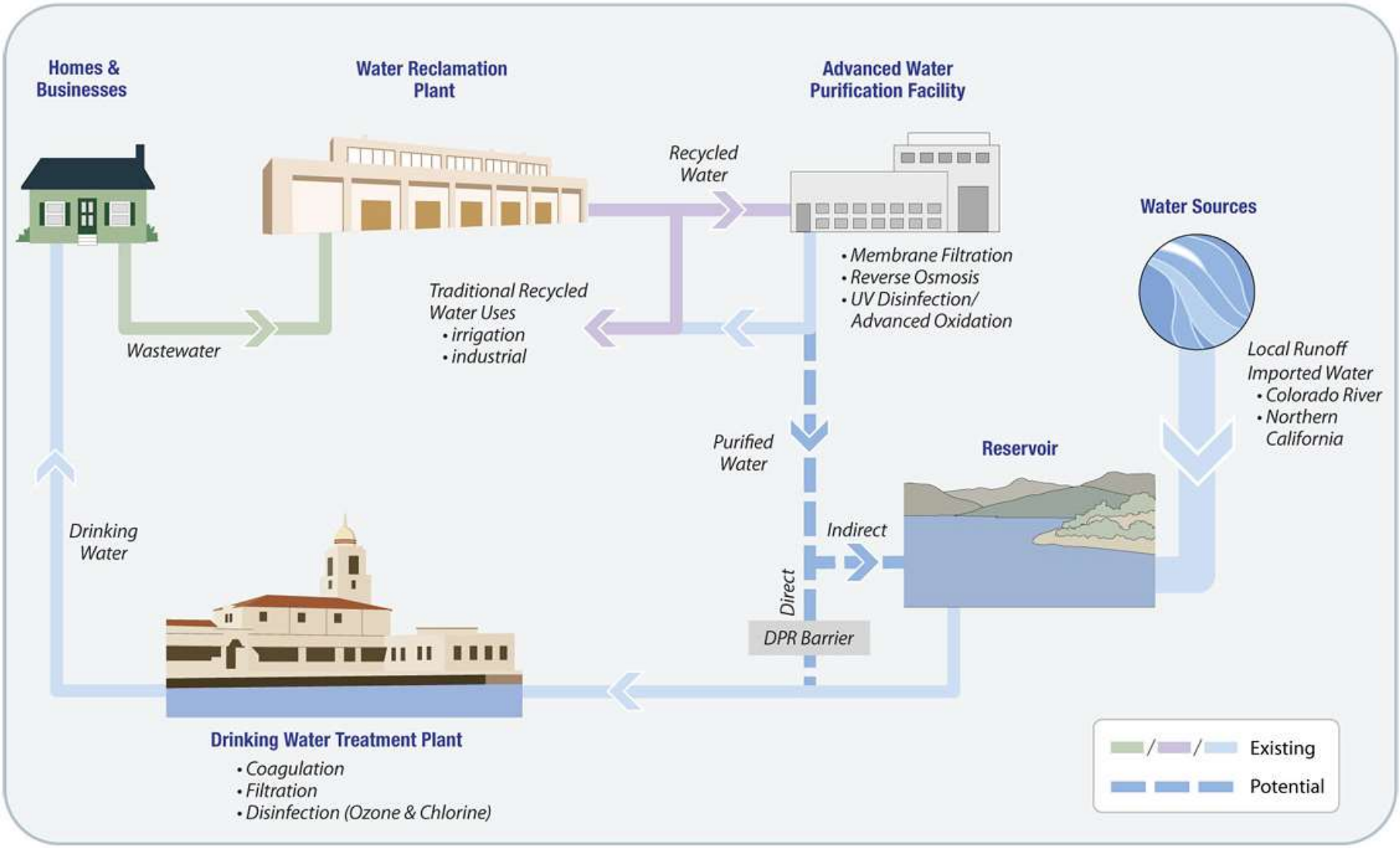


Figure 2.1. Flow diagrams for DPR: (a) with ATW introduced upstream of a DWTF; and (b) finished water introduced into the drinking water supply distribution system downstream of a DWTF. (Tchobanoglous et al 2015)

San Diego's Potable Reuse Plan



Compensation for Loss of the Gap

- **Means to compensate for loss of some or all of the environmental buffer could include:**
  - **More robust multiple treatment barriers**
  - **Enhanced monitoring for CECs or surrogates**
  - **Real-time or near real-time monitoring capability**
  - **Short term storage of product water to provide time for monitoring results prior to use as a potable supply**
  - **Alternative water supply source or means to quickly correct failure**

Panel Charge for DPR

Water Code, Chapter 7.3, Section 13565. (a)(1)

- … advising the department on public health issues and scientific and technical matters … (on) … the feasibility of developing uniform water recycling criteria for direct potable reuse.
- The expert panel shall assess what, if any, additional areas of research are needed to be able to establish uniform regulatory criteria for direct potable reuse.
- The expert panel shall then recommend an approach for accomplishing any additional needed research regarding uniform criteria for direct potable reuse in a timely manner.

DPR Briefing Paper Approach and Topics

- ***Briefing Paper Scope:***
  - ***Issue and background:*** *(summarize pertinent available research/technical information)*
  - ***Propose practical engineering/monitoring solutions and/or research***
  - ***Provide overall conclusions and recommendations***

DPR Briefing Overarching Questions

- ***Overarching Questions:***
  - **Definition of DPR (continuum) including inadequate environmental buffer.**
  - **The availability and reliability of recycled water treatment technologies.**
  - **Multiple barriers and sequential treatment processes that may be appropriate at wastewater and water treatment facilities.**
  - **Available information on health effects.**
  - **Mechanisms to protect public health from off-spec water and/or other failures.**
  - **Monitoring needed to ensure the protection of public health.**
  - **Other scientific or technical issues that may be necessary, including the need for additional research.**

DPR Briefing Paper Topics

- ***Briefing Paper Topics (examples of content):***
  - ***1) Bio-analytical Tools (Bioassays)*** *– issues related to their use in advanced treated wastewater (ATW) and drinking water.*
  - ***2) Quantifying Treatment Facility Reliability*** *– description of multiple barriers (redundancy, inherent performance, and mechanical reliability); online monitoring tools (sensors, surrogates and indicators); and performance objectives (process and overall facility compliance).*
  - ***3) Analytical Methods/Tools*** *– measurement of chemical water quality in ATW and drinking water (emphasis on indicators and surrogates).*
  - ***4) Molecular and Other Pathogen Monitoring Methods*** *– for monitoring pathogens in ATW and drinking water.*

DPR Briefing Paper Topics (cont'd)

- ***Briefing Paper Topics (examples of content):***
  - ***5) Antibiotic Resistant Bacteria (ARB) and Antibiotic Resistant Genes (ARG) in water*** *– state of the science, relative sources, potential exposure pathways (relevant), relative significance of concern.*
  - ***6) Comparative health risks*** *– associated with existing potable water supplies subject to discharge from municipal wastewater, storm water, and agricultural runoff.*
  - ***7) Public Health Surveillance*** *– example programs, ongoing national and state programs, health endpoints, sensitivity and interpretation of data, non-health based data, and feasibility of DPR surveillance program.*

DPR Briefing Paper Draft Schedule

Briefing Paper Topic	Panel Lead (Reviewer)	Panel Review Meeting Dates
1 - Bioanalytical Tools -	Richard Bull (Kevin Crofton, Michael Dennison)	Dec 1-2 2015
2- Quantifying Treatment Facility Reliability	Charles Haas (Jörg Drewes/Perry McCarty/Kara Nelson)	Dec 1-2, 2015 and Feb 2016
3 - Analytical methods/tools for chemicals	David Sedlak (Jorg Drewes)	Dec 1-2, 2015
4 - Molecular and other methods for pathogens	Joan Rose (Kara Nelson)	Feb 2016 and March 2016
5 - Antibiotic Resistant Bacteria (ARB) and Antibiotic Resistant Genes (ARG)	Walt Jakubowski (Joan Rose/Ryan Reinke/Kellog Schwab/Nick Ashbolt)	Feb 2016
6-Comparative Health Risks	Co-Chairs/Brain Pecson (Rhodes Trussell /Charles Haas/Michael Anderson)	April/May 2016
7 - Public Health Surveillance	Tim Wade (Walt Jakubowski/Michael Anderson)	June 2016
DPR Panel Preliminary Findings	Co-Chairs	June 2016 (internal draft)

Note: The first peson listed for each topic is the lead.

Questions?