Recharge Areas Overview (1st section)

- do the terms for artificial v. managed v. intentional recharge need to be defined? if they are interchangeable, use one term; need to flag for glossary
- this applies to more than artificial recharge; if this addresses intentional recharge, that brings up the issue of unintentional – is it appropriate with quality or quantity, do we want to sto
- what's the difference between unintended and natural – is that the same? natural recharge v. artificial (assisted), artificial can be managed.
- natural means unassisted. When I think of natural, I think of restoring meadows to make them groundwater recharge areas, of fixing what was broken. Once restored, natural systems function the way that they used to. Upper meadow restoration projects are intensely managed to repair down cuts and degraded meadows; large meadows in or near national forest lands are significant groundwater recharge/storage areas.
- categories of recharge areas need to be defined; restored groundwater recharge areas is an additional concept that needs to be added.
- there is also unintentional recharge from overirrigation in urban landscapes.
- what about recharge and unintentional recharge from abandoned wells? (does this link to pollution prevention?) road cuts and disturbed surface areas also affect infiltration
- within the text, could have discussions about unintentional recharge (ditches, other things that people have done – that are artificial but not managed)
- lining of ditches can create unintentional recharge, sometimes is managed and used intentionally (e.g. Kern); ditches provide shallow groundwater recharge, through surface water runoff into shallow groundwater – it doesn't seem like protection if recharge areas; it's an end place conveyance problem where benefits accrue to external parties.
- point to the Urban Runoff RMS regarding distributed and disbursed infiltration in urban areas through LID practices
- there are several concepts to tease apart: enhanced recharge v. recharge area protection, and protecting v. restoring infiltration processes
- different ideas about protecting recharge areas: Ca. DPH looks at recharge protection in terms of contamination; from a supply side, there is protection of existing recharge areas; restoration for supply purposes addresses existing (perhaps interrupted or impaired) recharge areas
- implicit in this is land management uses, and changes in forest and general plans to prevent subdivision
- what's the scope of this chapter? It seems to be all of the above
- these discussions show the richness of the issue.

Managed Recharge Areas in California

- this section makes the case that this is a viable strategy
- the DPH perspective is more of protection for existing groundwater drinking water wells from potentially contaminating activities. Didn't mean to enhance groundwater recharge. Protecting what's already out there. Perhaps enhancement
- other RMS might more directly related to enhancing groundwater recharge – e.g. stormwater runoff and recharge; could point to those.

- the aquifer that is being recharged (from urban runoff) is the shallow aquifer; also need to deal with point source recharge. Disturbance in recharge areas could cut off recharge for deeper aquifer. different types of groundwater systems (granite, shallow, deep confined) all have different recharge areas and rates.
- some of the best recharge areas are being built over and they are substituting slower recharge areas
- if the intent is to address all of the above, how can they be dealt with hydrogeologically or politically?
- that's a really valuable point. (Might be raising some issues.)
- still not totally clear on what the scope of the strategy is. One goal is of protecting recharge areas, keeping pollutants out. An additional goal might be restoration of recharge areas that have been degraded.
- Goals could be restated in terms of quantity and quality. Would it be going too far to have the RMS title say recharge protection and restoration?

Benefits of Recharge Areas Protection

- there are relationships to conjunctive use and flood control RMSs. There is a difference between explaining the chapter v. explaining the benefits. It might be good to highlight flood attenuation a little; and open space benefits
- land devoted recharge cannot be used for other [development?] purposes – parks and educational purposes of spreading grounds might be mentioned here; interpretive signs that describe habitat and recharge benefits
- protecting alluvial recharge areas, also protects water quality and temperature – important for salmonid watersheds.
- use of low impact develop – in appropriate places – can allow development
- if recharge areas are flood sinks, that's a value

Major Issues Facing Recharge Areas Protection

- population growth will intensify pressures; are septics an issue with growth?
- will climate change, affect evaporation rates? will that affect spreading basin management.
- stricter standards
- perhaps provide additional highlight on contamination from impermeable surfaces (paved surfaces)
- link issues of unmanaged recharge to recommendations
- governance is an issue: the multi-jurisdictional nature of recharge zones or shared resources
- in cities, vendors or contractors do not give customers an option for anything other than permeable surfaces – might want to raise awareness of that.

ACTION: Coordinate with Urban Runoff RMS (Bruce Fujimoto) regarding LID BMPs: using layer of sand with microbial action to manage permeable surfaces (immobilization of contaminants); gathering stormwater in one area increases likelihood of contamination

Recommendations Regarding Groundwater Remediation

- it would be helpful to categorize recommendations
- look to flood RMS to augment support for this; work with flood division to find recharge areas within setback levee areas
- 2 – 3 recommendations have quite a bit of overlap with aquifer recharge protection, might want to speak with other authors. (facilitator's note: all authors are experiencing this, there are great opportunities for cross-linking; Lew Moeller is working on tracking the connections between water quality RMSs)
- two other related RMSs are land use and planning and pollution prevention
- recommendations 6, 10, 12, and 14 all point to the need to raise awareness
- how might climate change impacts spreading basins – increased flows, larger? Will they behave differently?
- authors are using text boxes to provide examples; e.g. recommendation #6 can list Fresno Metropolitan District's "Just Beneath Your Feet" program
- should recommendation #8 – reference to the Ca. Water Code (instead of the Clean Water Act)? it's a waste discharge requirement
- recommendation #9, regarding sole source aquifers: are there others besides the Fresno sole source aquifer? is this about supporting local protection efforts?
- recommendation #10 – the Ca. Water and land Use Partnership; came out of National Education for Municipal Officials program
- would like to see a recommendation for agencies (DPH, DWR) to provide joint guidance for restoring infiltration in urban area to protect groundwater resources
- many local governments understand about recharge areas, but don't know where they are; provide link to resources that provide a fine enough scale for land use planners [note: map shown was developed from a detailed USGS, DWR data set]

ACTION: Discuss with APA representative to discuss planning piece.

- would like to see some reference to which aquifer is being protected, since different layers react differently – how do we better express this point? The area to be protected is rather small, compared to points of use.
- might want to discuss the types of aquifers and what some of the limitations are; there are aquifers where recharge is not over the aquifer – describe that and include recommendation of IRWM to address that issue
- would be helpful to address recommendations for regional and local government, as well as State government
- recommendation #7 is already in OPR guidelines – might want to address to local government
- perhaps eliminate the word State? (strike 1st four words) and specify who each recommendation is directed to
- greater specificity could be provided through categories
- on zoning issue, have requirements for new subdivisions: require new subdivisions to build a detention pond for recharging purposes. Detention ponds don't need to update the floodplain for urbanization. Also provides recharge to offset loses through development.

References

- include websites and publicatons

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