Designing and Funding Farm-based FloodMAR programs

Richard McCann, M.Cubed

Lunch MAR Presentation

May 5, 2021

M.Cubed

Contact Info
mccann@mcubed-econ.com
530.757.6363

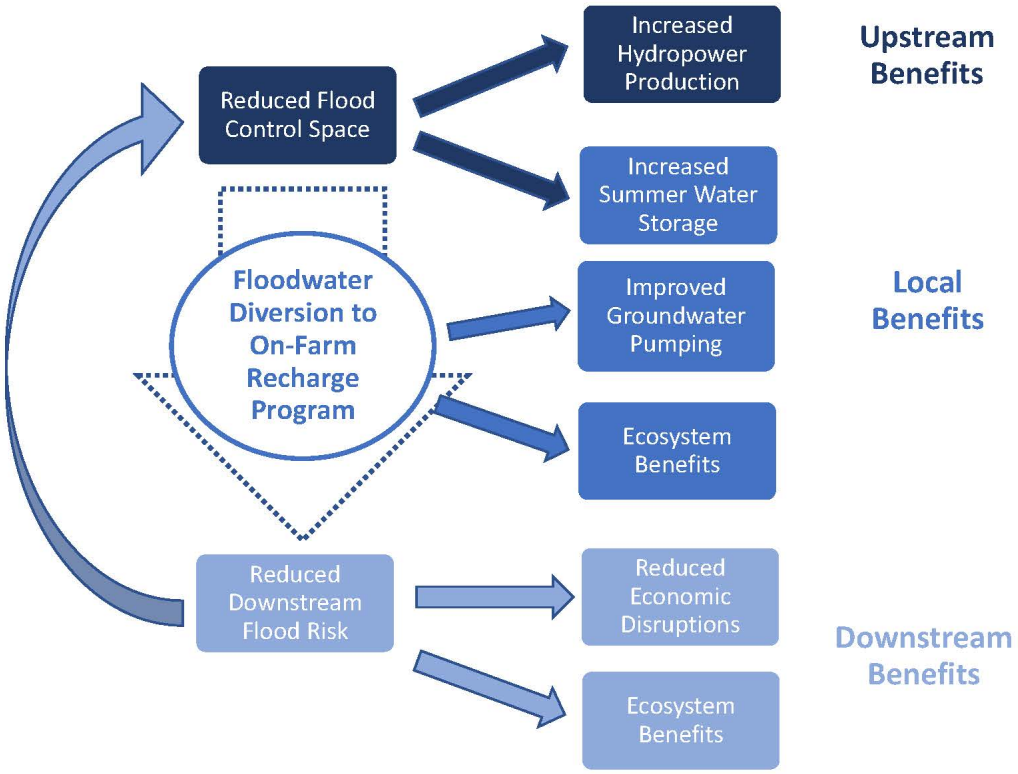
Introduction

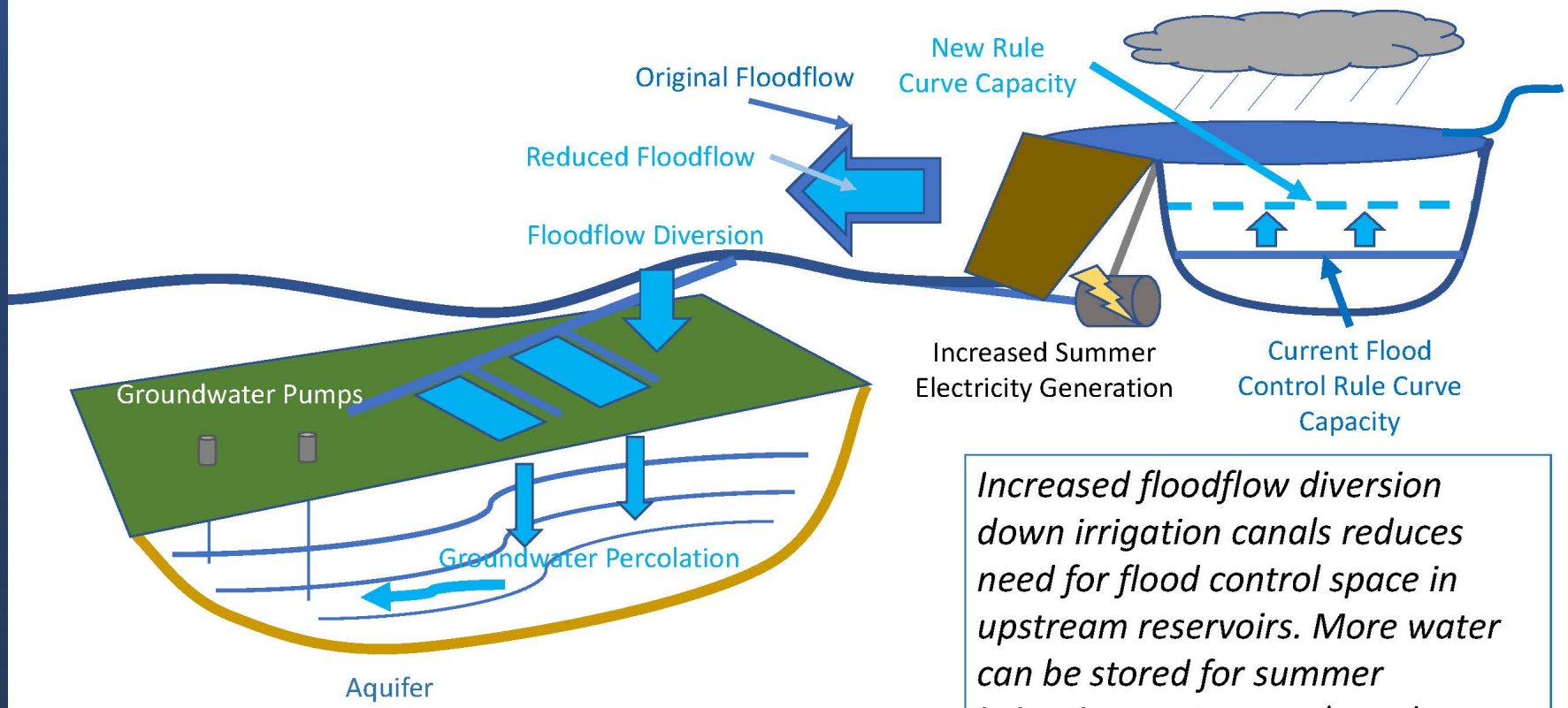
- M.Cubed: Consultants on Water, Energy & Resources
- Studies funded by Sustainable Conservation and the Resource Legacy Fund
- Addresses the questions:
  - What are the benefits & who are beneficiaries?
  - What financing can be tied to beneficiaries?
  - What incentives can be provided for participants for on-farm programs?

Value to Farmers in Reduced Pumping Costs

- Kings Basin example
  - 727,000 acres irrigated with 1 MAF from GW
  - 36,450 AF recovered in-basin per year from 47,400 AF diverted on average
  - GW table rises 15-25 feet over 50 years
    - 118,000 AF recovered leads to one foot rise in water table
  - Value per foot rise = $4 per AF pumped
- Implies $3.9M/year average benefit over 50 years
  - Value per AF diverted in reduced pumping costs = $82/AF
- ***Only part of the equation***: include storage and deferred surface water value; flood control benefits

A Universe of Benefits





Increased floodflow diversion down irrigation canals reduces need for flood control space in upstream reservoirs. More water can be stored for summer irrigation, water supply and hydropower generation.

Types of Benefits

Direct and indirect
Primary and secondary benefits
Private and public goods realized as benefits
Tangible and intangible

lowering of GW levels	reduction of GW storage	degraded water quality	land subsidence	depletion of interconnected surface water

increased surface water storage/water delivery	improved surface water supply reliability	Improved soil quality and productivity	intermittent wetland habitat

improved flood control	potential increase in hydropower production	secondary economic benefits

Survey 1

Which benefits are created by the floodMAR projects that you are working on beyond improved groundwater storage?

- Downstream flood protection
- Increased habitat
- Increased upstream water storage
- Increased summertime hydropower generation
- Other
- None

How Could This Be Financed?

- Look to beneficiaries
  - In-basin growers using groundwater
  - Downstream communities, infrastructure and activities
  - Habitat
  - Out of basin water importers
- A range of financing mechanisms available
  - Assessment districts: traditional but have limitations
  - Creative means can spread costs further and more accurately

Financing mechanisms linked to FloodMAR program beneficiaries

..	Financing Mechanisms	Beneficiaries included
Local	Local Pumping Fees	Local Ag Operators, Local Municipal Water Providers, Local Agricultural Water Providers, Private Well Users
	Local Groundwater Banking and Trading	Local Ag Operators, Local Municipal Water Providers, Local Agricultural Water Providers, Private Well Users
Upstream	Water Supply Reservoirs Payment	Upstream Flood Protection Agencies, Surface Water Project Customers
	Hydropower Payment	Hydropower Owners and Operators
Downstream	Flood Protection Fees	Downstream Commercial and Residential Property Owners, Downstream Agricultural Operators, Infrastructure Owners and End Users
	Ecosystem Payments	Downstream Ecosystem
Statewide / External	Non-Local Groundwater Banking and Trading	
	California Climate Investment Funding	
	Private Investment (e.g. Environmental Bonds)	

Up to 50 potential financing mechanisms available

Survey 2

What financing mechanisms have you considered to fund the floodMAR projects that you are working on?

- Fees on local groundwater pumping
- Assessments or property taxes through local special/water district
- Payments from downstream communities for enhanced flood control protection
- Grants from environmental conservancies and non-governmental organizations for ecosystem improvements
- Payments from agencies managing upstream water storage reservoirs?
- Payments from upstream hydropower generation owners
- Outside water purveyors or users for water banking services
- State or federal grants
- Have not considered yet

Participation Incentives: Selection

- Unlimited Participation
- Lottery
- First-come First-served / Queuing
- Scored Subsidy
- Auction-based

Participation Incentives: Pricing

- Uniform Price
- Scored Subsidy
- Reverse Auctions
- Discount Factor

Participation Incentives: Payment

- Cash
- Fee rebate
- Pumping allocations or other tradeable credits
- Two-stage enrollment or options

Participation Incentives: Issues

- Monitoring requirements
- Complementary market requirements (e.g. GSAs)
- Land rental complications
- Transaction costs

Survey 3

What actions are you considering to draw participants to the flood MAR projects that you are working on?

- Funding dedicated recharge basins owned by an agency
- Funding on-farm recharge investments for participating farmers
- Paying farmers incentives to participate in recharging
- Delivering free or discounted water to farmers who participate in recharging
- Charging farmers who don't participate in the recharging
- Other
- None

What's Next?

- Implementing pilots focused on institutions rather than effectiveness
  - Test different participation incentives
- Assess integration with FIRO for storage optimization
- What are the feasible financing mechanisms—financially & politically?

Links to report

Blog Post:

https://mcubedecon.com/2019/12/10/moving-forward-on-flood-mar-with-pilots/

Reports:

https://mcubedecon.files.wordpress.com/2019/12/m3-floodwater-recharge-memos-2017-1.pdf

M.CUBED

Contact Info
mccann@mcubed-econ.com
530.757.6363