7.0 Impacts and Benefits Of Sustainable Integrated Solutions

With the development of integrated watershed planning, multi-benefit and multi-purpose projects have moved to the forefront and have become one of the primary goals of the One Water One Watershed (OWOW) process. The idea of meeting a number of community needs with a multi-benefit project is not new; however, specialization within agencies that deal with water has often moved these project types to the backburner. Past efforts primarily have focused on single purpose projects, and the additional effort required to develop multi-objective solutions has made true multi-benefit projects relatively uncommon. In California, there has been an effort to incentivize collaborative planning through Integrated Regional Watershed Management (IRWM) Planning and associated funding sources.

This reliance on single-purpose projects is not unique to water. An interesting analogy can be drawn with the field of public health. Infectious diseases that plague much of the world can be treated by eliminating the infectious agent or interrupting the transmission of the pathogen. Public health programs traditionally focus on both approaches and use a team of physicians, sanitary engineers, and others professionals to address problems, often with great results. The development of more specialization in public health practice, in many cases, has been correlated with the resurgence of some diseases, such as malaria. Recently, scientists have become concerned that the "Balkanization of Science" has resulted in specialists with narrow training focusing only on a single aspect of a broader problem. Effective solutions often are missed by this approach (Moore, 2008). Similar statements could be made about water management. If water is considered in the broadest sense as a resource that benefits a wide group of interests, including those represented by the ten Pillar groups of the OWOW process, the projects that address as many of those interests as possible should be encouraged.

Some of the earliest multi-benefit water projects were done through a partnership between those interested in flood and groundwater management. Spreading grounds along the front slopes of local mountains have attenuated flood flows and recharged groundwater basins for nearly 100 years. OCWD partnered early with Orange County Flood Control District to provide recharge basins within flood control basins. More recently, Inland Empire Utilities Agency (IEUA) has worked with San Bernardino County Flood Control to modify the operation of the flood control system to maximize recharge opportunities. IRWD has partnered with the Orange County Flood Control District to store recycled water in some flood control basins. All of these projects primarily were facilitated by operational changes rather than the construction of new infrastructure, although in some cases the flood system was upgraded. Operational changes could occur only when both parties understood the needs and assets of the other.

The development of multi-benefit projects will remain challenging and require sustained effort by agencies that manage water. In the watershed alone, there are approximately 100 agencies that manage water in some way. This situation is not unique to this watershed. The Federal government has 12 agencies and eight separate committees all doing water-related work (Udall and Averyt, 2009). Agencies need to prioritize collaborative projects and provide the staff resources to ensure that such projects are developed.

The purpose of integrated watershed planning is to consider other disciplines or functional areas when planning and implementing projects. Benefits of this approach far exceed the immediate benefit of reducing controversy surrounding a particular project. The Pillars developed a list of potential benefits in a workshop to identify incentives associated with the development of multi-benefit programs and projects. They are listed below:

Solving Problems using a multi-benefit approach prevents the creation of other problems. Often when a single-function project is developed, it has an impact on other water-related areas, often unanticipated. The truth of this statement is often born out in a CEQA or NEPA analysis, where numerous problem areas can be identified.

Mult-benefit problem solving results in no missed opportunities. In a multi-benefit type of approach, a careful exploration of all aspects of a particular project often results in the identification of incremental project changes that can result in large benefits in other areas.

Cost and resource savings for the public can be achieved. When a multi-benefit project is developed, the cost of providing each benefit is often less than providing similar benefits to the public using two or more separate projects. As land and other public resources become scarce, these types of projects are more likely to be undertaken and provide more public benefit.

Developing projects that provide multiple benefits develops trust. As groups develop multi-benefit projects, trust is developed among different constituencies, each interested in a different aspect of water. These groups are more likely to work toward similar solutions in the future if they have successfully developed multi-benefit projects.

Multi-benefit projects are focused on building successful projects, not dispute resolutions. Groups focused on problem solving rather than dispute resolution or litigation save public resources and implement solutions to regional problems faster than they would had they disputed each other's single-function project.

Development of multi-purpose projects can develop better communication. Through the development of a project, groups that span geography or area of interest develop better communication and trust.

Multi-purpose projects often have diverse sources of funding. As multi-benefit projects are developed, multiple State and Federal funding sources become available providing cost share opportunities, and increasing the probability that a specific project would move forward.

Development of multi-function projects allows sharing of human resources. Each agency or constituency interested in developing a project has access to individuals with unique abilities and perspectives. Teams formed from diverse groups often develop unique solutions to problems.

Pillar Co-chairs met several times to develop matrices that demonstrated the potential benefits of multi-benefit projects undertaken between Pillar groups. In other words, how would a multi-benefit project conducted by one Pillar group benefit another group? The purpose of this exercise was to encourage the Pillars to begin to focus on how implementing projects to benefit their constituency can be designed to benefit others.

Drafts of these matrices were taken to three public workshops held in Orange, Riverside, and San Bernardino Counties. At these sessions, stakeholders were invited to comment on the work of the Pillars, as well as suggest their own benefits. Again, the primary purpose of these workshops was to encourage discussion around the concept of designing projects for more than one purpose. As the Pillar leaders completed their final drafts, they developed a list of project types that would benefit more than one Pillar and were worthy of further consideration and implementation.

Under OWOW 2.0 Plan, as some Pillars were folded into others and new ones arose as compared to the OWOW 1.0 Plan, new tables were developed that catalog the potential impacts and benefits at the region level and inter-region levels. A project that fulfills a particular watershed need can be designed to provide other benefits to several other Pillars and to surrounding regions. Maximizing these benefits provides for better projects and better use of public money.

Implementation Benefits of Prop 84 Round 1 and Round 2

Since the development of the OWOW Plan, there have been many multi-beneficial projects proposed and funded for the improvement of communities and water agencies alike. These projects have been financed by Proposition 84 Chapter 2 Round 1, and Proposition 84 Round 2, implementation of these developments has provided both regional and inter-regional benefits. Shown below in **Table 7-1** is a list of all the projects and their associated benefits. These projects were able to target key improvement areas within the watershed such as:

- Water Use Efficiency
- Stormwater Capture Storage
- Groundwater Desalination
- Recycling Reuse
- New Storage
- Non-point Source Reduction
- Salt Removal
- Preservation Restoration
- Reduction of TMDL's and other Pollutants

Also part of Round 2, another sequence of proposed and funded projects proved to be multi-beneficial to the watershed. Listed below on **Table 7-2** is a record of all the funded projects and their respective benefits. These follow the same key target improvement areas as shown above. Development and implementation of projects such as these contribute to the overall goal in creating a sustainable watershed.

Table 7-1 Implementation Projects Funded by Proposition 84 Chapter 2 Round 1

Project	Benefits
Santa Ana Watershed Vireo Monitoring and Breeding Bird Surveys	• Restored 300 acres of endangered bird species habitat
Arlington Desalter Connection Project No. 27 – 1208 & Western Municipal Water District Promenade Connection	• Water use efficiency increase of 11,200 AFY
Groundwater Replenishment System – Flow Equalizer	• Recycling reuse increase of 12,000 AFY •
Perris II Desalination Facility	• Groundwater desalination of 6,050 AFY • Non-point source reduction of 7 MGD • 21,000 tons of salt removed • Two acres of preservation restored
Cactus Basins No. 3 and No. 3A	• Stormwater capture storage increase of 15,000 AFY • 700 acres of preservation restored
Sludge Dewatering, Odor Control, and Preliminary Sludge Thickness at Plant No. 1, Project No. P1 – 101	• Recycling reuse increase of 78,400 AFY
Perchlorate Wellhead Treatment System Pipelines	• 101 tons of salt removed
Chino Creek Well-field, Wells 1,2, and 3	• Groundwater desalination of 2,900 AFY • One ton of salt removed
Cucamonga Creek Watershed Regional Water Quality Project (Mill Creek Wetlands)	• New storage of 160 AF • 14 acres of preservation restored
Repairs to the Unlined RCP Reach IVA and Reach IV-B Santa Ana Regional Interceptor (SARI)	• Supports continued brine disposal
Well 21 and 22 Project	• Groundwater desalination of 6,300 AFY
Alamitos Barrier Improvement Project	• 520 tons of salt removed
Arlington Basin Water Quality Improvement Project	• Stormwater capture storage increase of 1,300 AFY • 16 acres of preservation restored

Table 7-2 Implementation Projects funded by Proposition 84 Chapter 2 Round 2

Project	Benefits
Wineville Regional Recycled Water Pipeline and Groundwater Recharge Systems Upgrades	• Stormwater capture storage increase of 4,600 AFY • 46 acres of preservation restored

Forest First – Increase Stormwater Capture and Decrease Sediment Loading through Forest Ecological Restoration	• 1,750 acres of preservation restored
Perris Desalination Program – Brackish Water Wells 94, 95 and 96	• Groundwater desalination of 2,900 AFY • 4,060 tons of salt removed
San Sevaine Ground Water Recharge Basin	• Stormwater capture storage increase of 2,000 AFY • 26 acres of preservation restored
Vulcan Pit Flood Control and Aquifer Recharge Project	• Stormwater capture storage increase of 2,000 AFY • 60 acres of preservation restored
Wilson III Basins Project and Wilson Basins/Spreading Grounds	• Stormwater capture storage increase of 1,300 AFY •
Peters Canyon Channel Water Capture and Reuse Pipeline	• Reduction of TMDL and other pollutants
Corona/Home Gardens Well Rehabilitation and Multi-Jurisdictional Water Transmission Line Project	• Restoration of water service
Commercial/Industrial/Institutional Performance-Based Water Use Efficiency Program	• Water use efficiency increase of 400 AFY
Quail Valley Subarea 9 Phase 1 Sewer System Project	• Septic tank to sewer conversion
Francis Street Storm Drain and Ely Basin Flood Control and Aquifer Recharge Project	• Stormwater capture storage increase of 622 AFY
Customer Handbook to Using Water Efficiently in the Landscape	• Water use efficiency increase of 7,240 AFY
Plunge Creek Water Recharge and Habitat Improvement	• Stormwater capture storage increase of 1,250 AFY • 50 acres of preservation restored
Prado Basin Sediment Management Demonstration Project	• Stormwater capture storage increase of 450 AFY
Enhanced Stormwater Capture and Recharge along the Santa Ana River	• Stormwater capture storage increase of 14,600 AFY
14th Street Groundwater Recharge and Storm Water Quality Treatment Integration Facility	• Stormwater capture storage increase of 400 AFY
Soboba Band of Luiseño Indians Wastewater Project	• Feasibility Study
Canyon Lake Hybrid Treatment Process	• 525 acres of preservation restored • 50% reduction in total Phosphorus concentration
Recycled Water Project Phase I (Arlington-Central Avenue Pipeline)	• Recycling reuse increase of 6,000 AFY
Regional Residential Landscape Retrofit Program	• Water use efficiency increase of 1,000 AFY

Table 7-3 Impacts and Benefits of Water Resource Optimization

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	**Potential Benefits**	**Potential Impacts**	**Potential Benefits**
Water Resource Optimization	• Increased expenses • Surface water loss • Ocean habitat loss • New discharge issues associated with brine line disposal	• Quantifies environmental and habitat needs • Allows cost sharing partnerships to enhance and improve the capability of flood control infrastructure to capture and infiltrate storm flows • Allows sustainable growth • Provide high quality supply to clean up contaminated ground water basins • Promotes appropriate use of recycled water • Promotes change in water usage strategies • Encourages transition of landscaping to native plant types • Reduced water demands • Increases water supply • Improve water quality • Lowers the concentrations of imported salt in local surface and groundwater supplies • Surface storage provides opportunities for local recreation • Expands and enhances opportunities for recreational boating and sport fishing • Water utility easements provide trail opportunities • Enhances property value	• New outflow locations • New discharge locations • Additional storage/ infrastructure construction will increase Green House Gas (GHG) emissions	• Incentive for high quality industrial and commercial development • Supports smart growth, enhancing quality of life • Reduces the total carbon footprint associated with importing water • Provides mechanism to lower the concentration of industrial pollutants • Support less reliance on imported water supplies • Additional storage/ Infrastructure which help prepare for inter-regional drought, natural disaster, or terriost attack

Table 7-4 Impacts and Benefits of Beneficial Use Assurance

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	**Potential Benefits**	**Potential Impacts**	**Potential Benefits**
Beneficial Use Assurance	• Increase of Green House Gas (GHG) emissions • Increased energy use for water quality treatment • Increased machinery maintenance	• Reduced the input of nutrients which promote eutrophication • Promote greater biodiversity • Use of natural treatment systems provides incentive for restoration and construction of habitats • Supports and protects areas of biological significance including habitats for threatened and endangered species • Provides high quality drinking water for disadvantaged communities • Reduces the perceived need for bottled water • Expands and enhances recreational opportunities • Strategies that promote infiltration, such as LID (Low Impact Development) help reduce peak flows and flooding • Extends the life of existing infrastructure • Reduces risk to public health • Attracts high quality industrial developments • Expands opportunities for water recycling • Improves the efficiency of membranes and filters • Expands the range of available technologies • Extends the life of fixtures and appliances • Reduces the perceived need for water softeners.	• Possible damage to habitats • Increased energy consumption in association with pumping • Intrusion opportunity for invasive species	• Offsets climate changes stress on water supply by improving water quality overall • Improve the overall perception of the surrounding regions • Enhances value of property which encourages larger population growth • Incentive for high quality industrial and commercial development • Supports less reliance on imported water supplies • Preparedness to aid surrounding regions from inter-regional drought, natural disaster, or terriost attacks via the conservation of water supplies • Promotes new and innovative water treatment methods

Table 7-5 Impacts and Benefits of Water Use Efficiency

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	**Potential Benefits**	**Potential Impacts**	**Potential Benefits**
Water Use Efficiency	• Increased short term construction and site-specific impacts • Reduced flow downstream • Negative habitat impacts • Negative water quality impacts	• Reduce carbon footprint associated with transporting and processing water • Reduce carbon footprint associated with water use and consumption • Encourage planting of native plant species • Reduced standing plant biomass associated with fire threat in the riverbed • Promotes water efficient programs through water budget based rate funds • Encourage maintenance of open spaces and corridors for trails • Reduce salt importation • Encourage water recycling and opportunities for alternate technologies (i.e., gray water systems, cisterns for roof runoff) • Reduced stress on existing infrastructure • Provides opportunity for conservation of local surface and ground water flows	• Long term financial impact on local water retailers • As water use efficiency programs become more effective, the funds supporting them decline • Increased concentration of runoff due to decreased frequency of runoff • As water becomes more efficient it may cause a possible reduction of jobs	• Reduce the volume of poor quality runoff from reaching natural systems • Provide increased funding for reduced water demand government programs • Provide support to CA constitutional obligations and 20% by Year 2020 compliance • Provide inter-regional education opportunities through signage and multi-benefit/multi-purpose demonstration projects • Supports less reliance on imported water supplies. • Promote water wise methods • Less water requires less overall energy used for transportation (i.e., pumping)

Table 7-6 Impacts and Benefits of Land Use and Water Planning

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
Land Use and Water Planning	• Increased short term construction and site-specific impacts • Possible long term construction projects to meet Low Impact Development standards • Possible long term construction through urban areas, which may be detrimental to surrounding businesses	• Increased water supply • Improved water quality • Practice resource stewardship • Smart growth through higher density development reduces the carbon footprint associated with transporting and processing water • Helps improve watershed functionality • Preserve and integrate habitat into a built environment • Enhanced habitat connectivity and quality of life • Redevelopment and retrofitting provide opportunities for habitat restoration • Sewer systems protect groundwater quality, reducing the risk of contamination associated with septic system failure • Promotes natural groundwater recharge to reduce storm flow • Improved quality of stormwater runoff • Avoid flood control infrastructure costs • Provides opportunities for public-private partnerships • Reduced cost of regulatory compliance • Integration of recycled water into new development promotes sustainable growth • Higher density development reduces the cost of recycled water infrastructure • Sustainable development provides market for recycled water • Provides prescriptive measures for the efficient use of water and recycled water for irrigation and other non-potables uses • More open space promotes gw recharge • Promotes the efficient use of water • Provide market for green products and water saving devices	• Increased short term construction and site-specific impacts • Projects prove to be very expensive and continued maintenance could create government budget cuts elsewhere	• Supports less reliance on imported water supplies. • Creates opportunity for multi-agency projects that are adopted by other regions • Reduced nuisance flow from urban development into surface waters • Provides better local job to housing ratio reducing the carbon footprint associated with commuting • Encourages inter-regional innovative, low-impact designs and practices • Creates future ideas that prove to be more innovative energy-efficient designs

Table 7-7 Impacts and Benefits of Stormwater: Resource and Risk Management

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
Stormwater: Resource and Risk Management	• Increased short term construction and site-specific impacts • Possible damage to habitat areas used as flood zones • Loss of riparian and/or wetland acreage	• Improved flood management • Non-structural flood control channels help preserve natural habitats • Serves as a multi-purpose source for funding habitat related projects • Prevent channel erosion • Easements provide fire breaks and emergency access • Protect lives and properties • Reduced flood insurance costs • Provide improved water quality for recreational use • Integrated flood strategies enhance the value of developed properties • Reduced risk to infrastructure from debris dams associated with entering flood control systems • Integrated flood strategies improve the quality of surface, ocean, and groundwater • Support regulatory compliance and reduce compliance cost • Provides additional conveyance opportunities • Provides facilities to recharge recycled water • High quality stormwater dilutes the salt of recycled water and imported water recharge • Increased opportunities for groundwater recharge • Provides temporary storage for other uses • Increased available local water supply • Expanded local recharge reduces the need for irrigation	• Could result in a missed allocation of funding due to infrequent flows within the regions	• Large recharge basins help reduce the heat island effect, reducing all surrounding temperatures • Increased groundwater recharge that reduces the need for more energy intensive imported water • Connects neighboring biological communities • Better understanding of risk improves overall safety for state agencies and surrounding regions • Promotes multi-agency projects which provide opportunities to expand high quality development • Increased emergency flows that create inter-regional disaster planning

Table 7-8 Impacts and Benefits of Natural Resource Stewardship

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	**Potential Benefits**	**Potential Impacts**	**Potential Benefits**
Natural Resources Stewardship	• Increased short term construction and site-specific impacts • Loss of any potential urban future development • Possible long term construction near urban areas, which may be detrimental to surrounding businesses	• Protects natural habitats • Resource stewardship • Environmental services are an important link to public health – clean air, natural treatment of water • Improved stormwater quality • Provides additional flood control system capacity • Promotes groundwater recharge • Protects property from local flood impacts • Redevelopment strategy for blighted areas • Promotes consistency with general strategic plans • Provides large permeable area for storm water infiltration • Wetlands provide enhance water quality • Provides erosion control and reduce accompanying sediment load • Treatment wetlands reduce recycling costs	• Loss of land use and associated inter-regional revenue	• Provides a market for recycled water, decreasing reliance on imported water supplies • Provides environmental education outreach programs with inter-regional agencies • Improved overall aesthetics of surrounding regions • Promotes inter-regional economic growth through tourism

Table 7-9 Impacts and Benefits of Operational Efficiency and Water Transfers

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
Operational Efficiency and Water Transfer	• Increased short term construction and site-specific impacts	• Improved efficiency of water transfers • Improved infrastructure • Reduced green house gas • Maximizes water transportation strategies • Cuts down on inefficient water transfer strategies • Increased longevity of tools, machinery, and transportation vehicles • Less maintenance on transportation vehicles and pipelines • Decreased water waste • Reduced energy use • Creates more localized water availability • Cuts down overall maintenance costs • Decreased operational spending (i.e., fuel) • Decreased energy consumption	• Long term financial impact of inter-regional water retailers and wholesalers • Retrofitting programs requires copious funding from various government entities	• Supports less reliance on imported water supplies. • Minimizes emission of Green House Gases (GHG) • Reduces overall energy costs associated with pumping/wheeling • Aids emergency flow strategies that support inter-regional disaster planning

Table 7-10 Impacts and Benefits of Disadvantaged and Tribal Communities

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	**Potential Benefits**	**Potential Impacts**	**Potential Benefits**
Disadvantaged and Tribal Communities	• Increases energy consumption associated with pumping/wheeling • Increased short term construction and site-specific impacts	• Assurance of reliable drinking water • Contains projects that address safe drinking water and wastewater treatment needs of DACs (Disadvantaged Communities) • Helps meet State policies intended to provide access to safe, clean, and affordable water • Collaboration and access to fund water programs • Projects to better sustain Tribal water and natural resources. • Improved esthetics of lakes and streams • Enhanced value of property • Promotes tourism	• Increase of inter-regional water usage • Increase of green house gases (GHG) emissions	• Creates opportunity for high quality future development • Proposals that include the development of Tribal consultation • Develop multi-benefit projects with consideration of affected disadvantaged communities and vulnerable populations • Helps address critical water supply or water quality needs of California Native American Tribes • Increased cost associated with additional supplies/water quality

Table 7-11 Impacts and Benefits of Government Partnership

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
Government Partnership	• Possible long term operating cost • Delayed implement ation of projects between regional agencies	• Creates partnership with DWR (Department of Water Resources) • Creates partnership with local agencies • Provides opportunity to create multi-agency committees • Possibility to generate more funds • Ease of access to data through government agencies • Increased effective communication throughout the watershed • Long-term implementation of IRWM plan through new relationships • Collaboration implementing plan objectives • Interim changes and formal changes to plans • Updating or amending IRWMP's easily • Stakeholder involvement • Improved resource integration	• State/Federal agency interest inconsistency • Extended delays for agreement on projects • Possible funding allocation disputes	• Facilitates development of inter-regional water management • Sustains development of inter-regional water management • Coordination with agencies surrounding the region • Reduces time between data exchange within inter-regional agencies • Ability to collaborate inter-regional goals • Development of new multi-purpose rebate programs • Increase of multi-purpose projects • Coordination of IRWM with State and Federal agencies

Table 7-12 Impacts and Benefits of Energy and Environmental Impact Response

Pillar	Within IRWM Region		Inter-Regional	
	Potential Impacts	Potential Benefits	Potential Impacts	Potential Benefits
Energy and Environmental Impact Response	• Increased short term construction and site-specific impacts • Potential long term operating cost	• Decreases carbon footprint • Benefits to public health • Increases funding opportunities for community enhancement • Reduction of greenhouse gas emissions • Reduction of the heat island effect • Trail usage encourages non-gasoline modes of transportation • Promotes efficient energy use • Provides cheaper, natural treatment for surface water and groundwater recharge • Provides more green rebate program opportunities • Improvements to infrastructure are more energy efficient • Promotes a sense of well being for the community • Improved surrounding habitats • Lower use of limited resources	• Increased long term construction may have an economic impact on surrounding areas • Expensive future repair and/or retrofitting costs	• Increase of government green programs • Reduced inter expense of resources • Reduced unnecessary waste • Reduction of Green House Gases (GHG) emissions • Protects interconnecting natural forests • Maximized energy efficiency • May spur more projects/ideas of reducing carbon footprint

Conclusion

Implementation of these projects found in the OWOW 2.0 Plan proves to be critical in creating a sustainable watershed. We must understand that the development of ideas and methods not only have a direct impact within the region, but also inter-regionally. The information above is a list of potential impacts and benefits relatable to the Pillars found in the OWOW 2.0 Plan. These benefits and impacts are separated into two different categories that give a brief analysis of the strategic implementation. It is important that these potential impacts are realized so that if they do occur, the watershed is prepared. Also it is important to see the potential benefits these outcomes could have on the region and inter-regions. The development and implementation of multi-benefit projects will remain challenging and require sustained effort by agencies that manage water.