

**Imperial Irrigation District**

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The Imperial Irrigation District (IID) is a community-owned utility and provides irrigation water and electric power to the lower southeastern portion of California's desert. Their service area encompasses the entire Imperial Valley and the southern section of Coachella Valley, including 500,000 acres of farmland. Established in 1911 under the California Irrigation District Act, IID is governed by a five-member board of directors elected by the public. The organization is divided into eight functional areas: Executive Offices, Water Department, Power Department, Finance & Treasury, Human Resources, Public Affairs, Information Systems, and General Services.

## **EXISTING WATER QUALITY PROJECTS**

**1. New River Wetlands Project.** The purpose of the Brawley Constructed Wetlands Demonstration Project is to study how wetlands can improve the quality of agricultural drain water, New River stream flows, and inflows to the Salton Sea. To achieve this goal, two wetlands have been constructed: the 7-acre Brawley Site and the 68-acre Imperial Site. These sites will serve to demonstrate the effectiveness of using constructed wetlands through a 3-year monitoring program for constituents of concern in the water column, sediment, and biota. At the Brawley site, water from the New River is diverted to the wetland to test the effectiveness of vegetative cells to remove organic carbon nutrients from the water and to provide critical wetland habitat all without contaminating the wildlife. The wetland located at the Imperial Site receives water diverted from the Rice 3 Drain which is composed entirely of agricultural effluent. The focus of this wetland is slightly different from the smaller Brawley Site. This wetland is designed to

remove sediment from tailwater runoff, nutrients from fertilizer application, and selenium from evaporative concentration of irrigation water.

**2. Fig Lagoon.** This project was carried out in conjunction with the U.S. Bureau of Reclamation. The Fig Lagoon was created from the need to repair the Fig Drain outlet that was damaged during Tropical Storm Kathleen in September of 1976. During reconstruction of the area near the New River channel, the outlet was enlarged creating an evaporation pond. The pond receives water from the Fig and Wixom Drains and has a surface area that covers approximately 80 acres. Ponds such as this serve as detention basins, facilitating the reduction of suspended sediments in the water column. Reduced suspended sediments discharging into drains correspond to reduced pesticide levels such as DDT that adsorb to soil particles. The larger surface area also serves as a benefit to the breakdown of nutrients, selenium, and pesticides by exposure to sunlight.

**3. Drain Water Quality Improvement Plan.** Through a cooperative effort of IID and Regional Board staff, a Drain Water Quality Improvement Plan was prepared by IID in 1994. This program was prepared within a modeling framework of the drain system for the Imperial Valley drain shed. The Plan was designed to specify the actions that IID would take to protect the beneficial uses of water bodies receiving agricultural drainage flows, the time schedule, and estimated costs for implementing these actions. The Plan addresses three elements:

- 1) A water quality monitoring program to identify and quantify the extent of drain water pollution within the IID service area;
- 2) The identification, testing, and implementation of Best Management Practices that have the potential to improve drain water quality;
- 3) A program to educate farmers within the IID service area.

**4. Drain Water Quality Sampling Program.** A water quality monitoring program was included in the Drain Water Quality Improvement Plan in order to identify and quantify drain water pollution within IID's service area. The monitoring plan consists of:

1. Monthly sampling of the New River, Alamo River, South Central Drain, Holtville Main Drain, Greeson Drain, and Trifolium 12 Drain for several constituents of concern;
2. Quarterly sampling of the All-American Canal for the same parameters required in monthly drain water testing;
3. Quarterly chronic toxicity testing in the Alamo River and All-American Canal;
4. Semi-annual biological and sediment testing in the Alamo River.

The sampling was conducted in 1996/97 and came to a halt in early 1998, induced by the Regional Board in order to focus efforts on the development of TMDLs for the region. For now, the IID is holding off with sampling until further instructions are specified by

the Regional Board in regards to changes in the sampling program. Currently, the IID is collaborating closely with the Regional Board in preparing the new TMDL draft.

**5. Lewis Drain Pilot Project.** In an effort to improve drain water quality in the Imperial Irrigation District's drainage system for potential reuse, the IID in partnership with the U.S. Bureau of Reclamation constructed the Lewis Drainage Treatment Facility. The concept behind the project is to separate tailwater from tilewater in order to explore the treatment options for each. Tailwater is collected in a widened drain where the water level is controlled by concrete drop structures. The goal of the widened drain is to facilitate the reduction of nutrients and pesticides as well as to assess the effectiveness of a flat surface drain system to reduce sediment loading in the rivers. When sediment loading is reduced, pesticides adsorbed to the sediments will also be reduced in the water column. Tilewater is diverted to an underground gravel treatment channel 1200 feet long, 28 feet wide, and 5 feet deep. The goal of the gravel-filled trench is to remove nitrogen and selenium from subsurface drain water by bacterial reduction. The project is part of the 'Imperial Valley Water Reclamation and Reuse Study' that represents a cooperative effort between the IID and BOR.

The Lewis Drain is sampled for selenium, nitrate, and ammonia on a weekly basis in the water column as well as periodic soil sampling for pesticides (see attached sampling schedule for the wetlands). This sampling was initiated in January, 2000. The measurements indicate that some selenium is lost to the pond (see hardcopy document for more information).

**6. Triploid Grass Carp Aquatic Vegetation Control.** Triploid grass carp are used by the IID to control the spread of hydrilla weeds which clog the IID's canal system. These fish are voracious eaters of hydrilla weeds. The use of triploid grass carp for vegetation control in the IID canal system began 1981. Currently, IID is California's only authorized breeder and producer of triploid grass carp. With less debris clogging the canals, suspended sediment is less likely to accumulate, resulting in reduced sediment build-up and dredging. Furthermore, chemical and mechanical means of vegetation control in the canals are avoided.

**7. River Water Monitoring Program.** This program involves monitoring of general physical and mineral properties in the major drains. The sampling sites represent fixed locations situated at the inlet of the Alamo River (border region) as well as at the outlet to the Salton Sea. Further sampling sites are located in the New River outlet area to the Salton Sea (more information in regards to monitoring projects along the New River is available from the Regional Board that does extensive monitoring in this particular region, especially in the inlet area). Sampling is conducted on a monthly basis and is not part of any kind of Trend Analysis program. To date, there is no knowledge of any particular trigger points. The IID is prepared to take action in the case of significant contamination, however the need for this has never arisen. Historical data are available upon request.

**8. Irrigation Runoff and Reduction Program.** This program was initiated in 1983 to evaluate the technical and economic feasibility of reducing irrigation runoff on a variety of crops. Tailwater recovery systems collect tailwater in a small field reservoir three to

four acre-feet in size. The water is then delivered at the appropriate flow rate and time to the head of the field via a pump and pipeline system. With reduced run-off, suspended sediment is also decreased in the drainage water. Twenty-five tailwater recovery and return systems have been constructed and operated as part of the IID/MWD Project. In 1998, two other methods were added to this program, including level basin and cascade basin irrigation. The level basin consists of a uniform level farm plot that produces no irrigation runoff. This method effectively conserves water and eliminates sediment discharge into drains. In uneven or undulating terrain, the cascade basin method is used. This method uses a series of plots that drain irrigation water from one plot to the next, which conserves water and reduces suspended sediment discharge.

**9. Tailwater Return Systems (Demo and MWD).** Tailwater return systems are used to reclaim irrigation water that would otherwise be discharged to drains. The surface runoff from irrigation of a single field or multiple fields is collected in a small reservoir. Recovered water is pumped back to the head of the field by means of a pump and underground pipeline where it is blended with canal water and reused for irrigation. Since tailwater discharge is significantly reduced or eliminated, suspended sediment in the drains is decreased. A Tailwater Recovery Demonstration Program was performed and funded by IID to evaluate pumpback system operation alternatives as well as the technical and economic feasibility of their use in the Imperial Valley. The program consisted of a five-year study of five pumpback systems that were designed and constructed by the IID and installed on grower/operator fields. The systems were intensively monitored to determine potential impacts on soil and water resources. The impact on soil salinity from the use of recycled water was not conclusive, however it appeared insignificant. There was not enough to create any noticeable scalding problems. Weed control and maintenance costs were higher due to the addition of the tailwater recovery pond and necessary tailwater ditches. The cost of installing a permanent pumpback system varies according to the number of fields it includes. Nearly 20 permanent systems have been installed in the Imperial Valley to date.

**10. Imperial Dam Desilting Basins.** At the Imperial Dam, the All American Canal thrashrack prevents debris carried by the Colorado River from entering the intake portion of the AAC. River water is then screened by three desilting basins. The design capacity of each basin is 4000 c.f.s with a sediment removal capacity of 70,000 tons per day. These basins remove sand and silt from the river's water before it passes to the All American Canal by increasing the detention time and allowing settling to occur. The silt is returned to the river by means of six sludge return pipes that deposit the silt into the California Sluiceway.

**11. Raw Surface Water Monitoring / Title 22.** This monitoring program represents a joint watershed effort between the IID and a number of cities and small entities. The sampling sites are determined by the Department of Health Services and are identified by numbers (IID uses names to identify their sampling sites). To curb costs, the IID conducts the complete sampling course in the main canals of it's own accord. Subsequently, the samples are analyzed by the Clinical Laboratories in San Bernardino. The results are sent back to the different agencies involved, including the Dept. of Health

Services which receives a final report summarizing all the findings. The data are stored in hardcopy format.

**12. Surface Water Monitoring at the Salton Sea.** The IID has five sites located in the beach areas of the Salton Sea, identified by names (Between Rivers, Bertram Station, Sandy Beach, Salton Sea Beach, and Desert Beach). Sampling parameters include general mineral and physical properties including conductivity, pH, TDS, etc. The sampling program was initiated in 1945. The sampling is conducted on a semi-annual basis during April/May and October/November. Current data sets (1993 to present) are stored in Excel spreadsheets and are available upon request.

**13. Peach/Pampas Watershed Study.** This study was developed to help quantify the improvement of water quality in agricultural drains when implementing sediment load reducing on-farm best management practices. Pre-project data of sediment transport off individual fields and at drain discharge points was collected in a small 3,000 acre watershed. Details such as crop type, field size, delivery rate, and other relevant information were collected at the time of sampling. Sediment reducing BMP implementation was to follow and post-project data was to be compiled to estimate a reduction in sediment load. However, due to the large number of variables (e.g. soil type, type of crop, method of irrigation, etc.), the pre-project sampling data did not appear to give conclusive results so the project has been put on hold pending the adoption of added data controls.

**Note:** The New River Wetlands Project, Lewis Drain Project, and Imperial Dam Desilting Basins have a monitoring program. The desilting basins are only sampled for suspended sediment loads for efficiency and maintenance scheduling purposes.

### **GIS Activities**

The IID currently has GIS layers for drains, canals and canal gates, lakes and reservoirs, roadways, land parcels, city boundaries, and the Salton Sea. Water quality data is not integrated into the GIS at this point in time.

**Computer infrastructure.** The IID have a central IT department.

### **Interaction with other Agencies**

Agencies collaborating with the IID are as follows:

- TMDL TAC
- USGS
- Cities



- County Health Department
- Indian Tribes
- Desert Wildlife Unlimited
- U.S. Bureau of Reclamation
- Imperial County – Properties Service
- California Dept. of Fish and Game
- U.S. Fish and Wildlife Service
- University of California
- County Agencies
- Imperial County Board of Supervisors
- Ducks Unlimited
- U.S. Geological Survey
- U.S. Environmental Protection Agency

#### **Data Used and Generated**

The following information was provided in the form of brochures and hardcopy documents:

- Summary of the existing water quality projects
- New River Wetlands Project
- Drain Water Reclamation and Reuse Study
- Drain Water Quality Improvement Program
- Fig Lagoon Project (Fact Sheet)
- Geographic Coordinates (Lat/Long) for the different ponds and main drains
- Drain Water Quality Improvement Plan (Plan with detailed sampling information); map with site locations
- Lewis Drain Treatment Facility
- Water Conservation (Fact Sheet)
- Natural Resource Project Inventory (NRPI) (Entry Form for NRPI Projects)

**Data Format.** All of the data are in hard copy format. Some data have been entered into Excel spreadsheets (Drain Water Quality Sampling Program) and other data have been consolidated into summary sheets (River Water Monitoring, Imperial Dam TSS, Salton Sea beaches).

### **Opportunities and Constraints to Data Sharing**

The IID collaborates on a regular basis with a number of agencies involved with water quality monitoring.

Legal actions relative to local and regional water rights are not conducive to widespread access and sharing of certain types of data at this point in time. However, requests for most water quality data will be granted upon receipt of a letter of request.