

## SJBEP Water Quality Volunteers Monitoring Program

Restoration, Sustainability, and Health of the Caño Martín Peña Workshop USEPA Region 2-ORD June 9, 2017 By Dr. Jorge Bauzá-Ortega Science Director



### Cuenca del Estuario de la Bahía de San Juan

OCÉANO ATLÁNTICO



### WATER QUALITY MONITORING VOLUNTEER PROGRAM





## Since 2008, the SJBEP Water Quality Monitoring Program:

- Provided opportunity to more than 400 volunteers.
- An Approved Quality Assurance Project Plan.
- Provided data to the PREQB for the 305(b)/303(d) Water Quality Assessment Integrated Report and other agencies, academia, stakeholders, etc.
- Supported students in their instigations and projects.
- Being used by Federal and State agencies in their decision making process.



## The water quality measured parameters

are: Temperature ✓ Conductivity Turbidity Secchi depth ✓ Total organic carbon ✓ Dissolved oxygen Total nitrogen ✓ Nitrite & Nitrate ✓ Total phosphate Chlorophyll BOD Turbidity Fecal coliform Enterococus







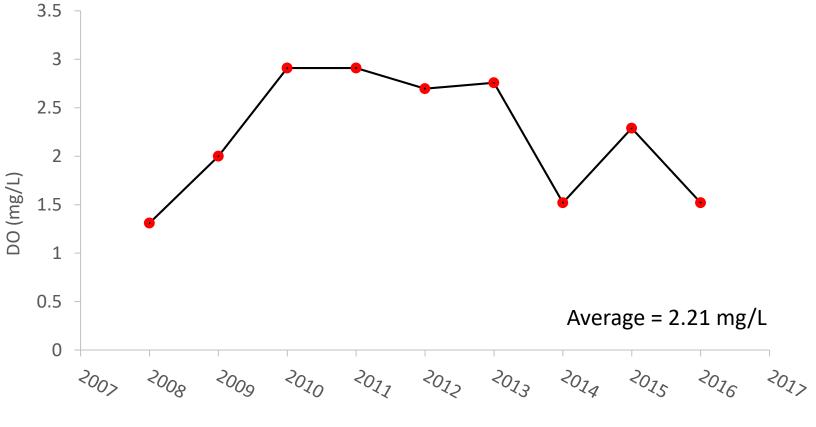






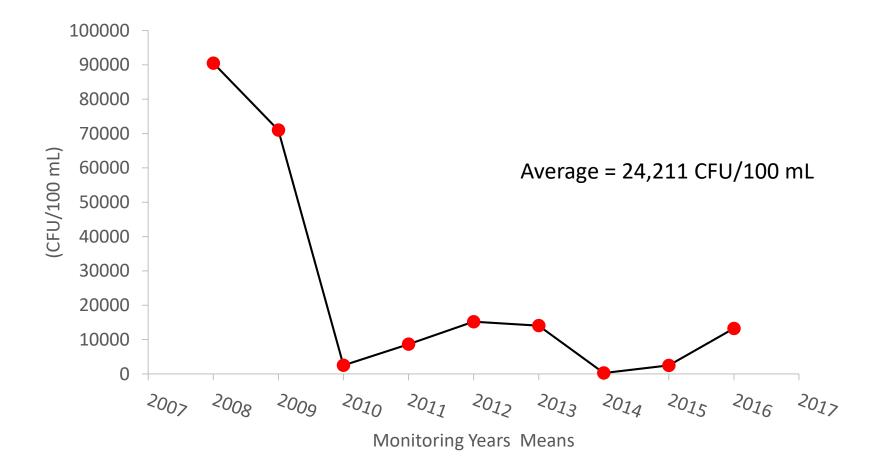
| ×N       | Microsoft Excel - Book1   |                           |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
|----------|---------------------------|---------------------------|--------------------|------------------|--------------------------|-------------------|-------------------|-----------------------------|----------------|----------------|----------------|----------------|-------|-----|---|
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| . •      | P6                        | ▼ fx                      |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
|          | A                         | B                         | С                  | D                | E                        | F                 | G                 | H                           |                | J              | K              | L              | М     | N   |   |
| 1        |                           | Hydrolab (                | Quanta             |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
| 2        |                           | Temp.                     |                    | °C               | 31                       | 31.8              | 32.7              | 30.8                        | 30.5           | 30.7           | 30.63          | 30.28          | 30.6  |     |   |
| 3        |                           | DO                        |                    | mg/L             | 6.82                     | 15.14             | 8.32              | 1.71                        | 4.53           | 6.46           | 6.85           | 3.88           | 0.29  |     |   |
| 4        |                           | DO                        |                    | (%)              | 98.5                     | 227.9             | 122.5             | 23.9                        | 65.3           | 101            | 108.7          | 6.16           | 4     |     |   |
| 5        |                           | Specific Conductance      |                    |                  | 21.7                     | 19.7              | 20                | 21.9                        | 31.9           | 47.5           | 48.3           | 36.6           | 39.4  |     |   |
| 6        |                           | Salinity                  |                    | pps              | 13.77                    | 11.87             | 12.4              | 13.3                        | 19.4           | 31.4           | 31.66          | 23             | 21.7  |     |   |
| 7        |                           | Turbidity                 |                    | NTU              | 0.9                      | 6.3               | 1.7               | 1.8                         | 2.1            | 2.8            | 2.4            | 14.2           | 32    |     | _ |
| 8        |                           | pН                        |                    |                  | 7.55                     | 8.62              | 7.95              | 7.22                        | 7.37           | 7.9            | 8              | 7.7            | 7.4   |     |   |
| 9        |                           | Sechi Depth               |                    | meters           | Bottom Depth             | 0.75              | 1                 | 1.545                       | 1.79           | 1.19           | 0.8925         | 0.47           | 0.36  |     | _ |
| 10       |                           | First t                   |                    |                  | N/A                      | 0.7               | 1                 | 1.54                        | 1.74           | 1.21           | 0.88           | 0.465          | 0.385 |     | _ |
| 11       |                           | Second                    |                    |                  | N/A                      | 0.8               | 10-25             | 1.55                        | 1.84           | 1.17           | 0.905          | 0.475          | 0.335 |     | - |
| 12<br>13 |                           | Start Ti                  |                    | am/pm            | 12:07<br>12:13           | 12:40<br>13:00    | 12:35<br>12:38    | 12:20<br>12:25              | 12:00<br>12:03 | 11:30<br>11:45 | 11:11<br>11:20 | 10:10<br>10:15 | 10:30 |     | - |
| 13       |                           | End Ti                    | me                 | am/pm            | 12:13                    | 13:00             | 12:30             | 12:25                       | 12:03          | 11:45          | 11:20          | 10:15          | 10:45 |     |   |
|          | Α                         | В                         | С                  | D                | E                        | F                 | G                 | Н                           |                | J              | K              | L              |       | N   | N |
| 1        | Results Re                | ported by                 | EQ Lab             | on June 2        | , 2008.                  |                   |                   |                             |                |                |                |                |       |     |   |
| 2        |                           |                           |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
| 3        |                           |                           |                    |                  |                          |                   |                   | Monitoring Stations Results |                |                |                | _              |       |     |   |
| 4        | Date                      | Paramenter                |                    | Method           |                          | Units             | MDL Limit         | LT1                         | LT2            | LT3            | CS1            | CS2            | PLE   |     |   |
| 5        | 5/20/2008                 | Oil & G                   | Grease             | EPA              | 1664 A                   | mg/L              | 1.4               | 1.5                         | 2              | 1.4            | 1.4            | 3              |       |     |   |
| 6        |                           | Ammonia                   |                    | EPA              | \$350.1                  | mg/L              | 0.10              | BDL                         | 0.13           | 0.24           | 0.15           | 0.17           |       |     |   |
| 7        |                           | Nitrate & Nitrite,tota    |                    | al EPA           |                          |                   | 0.01              | BDL                         | BDL            | 0.05           | BDL            | 0.03           |       |     |   |
| 8        |                           | Total Phosphorus          |                    | EPA 365.3        |                          | mg/L              | 0.010             | 0.019                       | 0.087          | 0.075          | 0.115          | 0.139          |       |     |   |
| 9        |                           | TOC                       |                    | EPA              | EPA 415.1                |                   | 0.500             | 2.160                       | 3.240          | 3.330          | 4.040          | 2.760          |       |     |   |
| 10       |                           | Chlorophyll               |                    | SM 1             | SM 10200 H               |                   | 0.100             | 2.780                       | 3.350          | 4.220          | 6.250          | 4.130          |       |     |   |
| 11       |                           | Turbidity                 |                    | SM               | SM 2130 B                |                   | 0.05              | 4.53                        | 2.29           | 4.73           | 2.5            | 2.02           |       |     |   |
| 12       |                           | BOD                       |                    | SM 5210 B        |                          | mg/L              | 1                 | 14                          | 9              | 5              | 6              | 2              |       |     |   |
| 13       |                           | Coliform-Fecal            |                    | SM               | SM 9222 D                |                   | 2                 | 18                          | 210            | 1600           | 11             | 130            |       |     |   |
| 14       |                           | Fecal Enterococcu         |                    | 5 SM 9230 C      |                          | CFU/100mL         | 10                | <10                         | <10            | 340            | <10            | <10            |       |     |   |
| 15       |                           |                           | Number             |                  |                          |                   |                   | 1209706                     | 1209707        | 1209708        | 1209709        | 1209710        |       |     |   |
| 16       |                           |                           |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
| 17       |                           |                           |                    | CS1,CS           | S2: Suarez               | Channel           | MDL: Min          | imum deteo                  | ction Level    |                |                |                |       |     |   |
| 18       |                           |                           |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |
|          |                           |                           |                    |                  |                          |                   |                   |                             |                |                |                |                |       |     |   |

### Caño Martín Peña Dissolved Oxygen

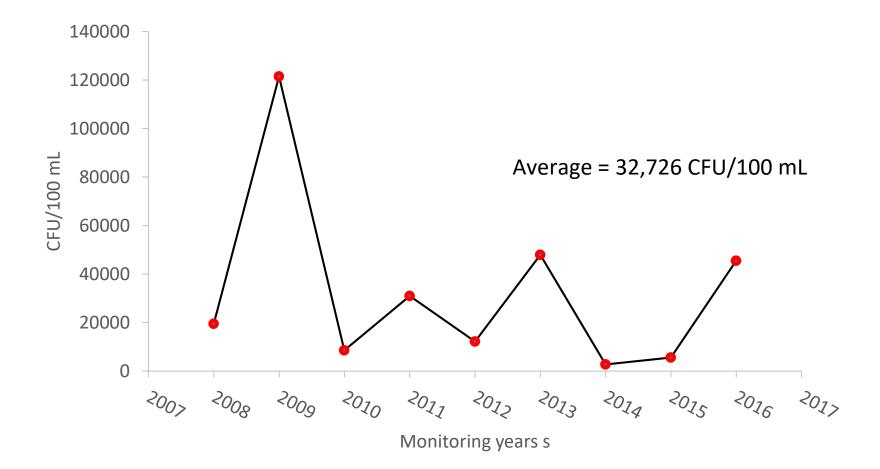


**Monitoring Years** 

### Caño Martín Peña Fecal Enterococcus



### Caño Martín Peña Fecal Coliform



# Water Quality Index/Score Card Guidelines

- Provides a convenient means of summarizing complex water quality data and facilitating its communication to a general audience.
- The water quality index is a number between 0 (worst water quality) and 100 (best water quality).
- The numbers are divides into five (5) descriptive categories to simplify presentation.

| ÍNDICE DE<br>CALIDAD DE<br>AGUA | DESCRIPCIÓN  | CALIFICACIÓN |
|---------------------------------|--|--------------|
| 95-100                          | EXCELENTE: la calidad<br>del agua se encuentra<br>protegida. La condición del<br>cuerpo de agua se acerca a<br>condiciones prístinas y natu-<br>rales. | Α            |
| 80-94                           | BUENO: la calidad del agua<br>se encuentra protegida. El<br>cuerpo de agua exhibe un<br>grado de contaminación<br>menor y con poca frecuencia.         | В            |
| 65-79                           | REGULAR: la calidad del<br>agua es usualmente protegida.<br>El cuerpo de agua ocasional-<br>mente exhibe niveles de con-<br>taminación.                | С            |
| 45-64                           | MARGINAL: la calidad del<br>agua está poco protegida. El<br>cuerpo de agua se encuentra<br>frecuentemente amenazado y<br>contaminado.                  | D            |
| 0-44                            | POBRE: la calidad del agua<br>no está protegida. El cuerpo<br>de agua se encuentra constan-<br>temente amenazado y con-<br>taminado.                   | F            |

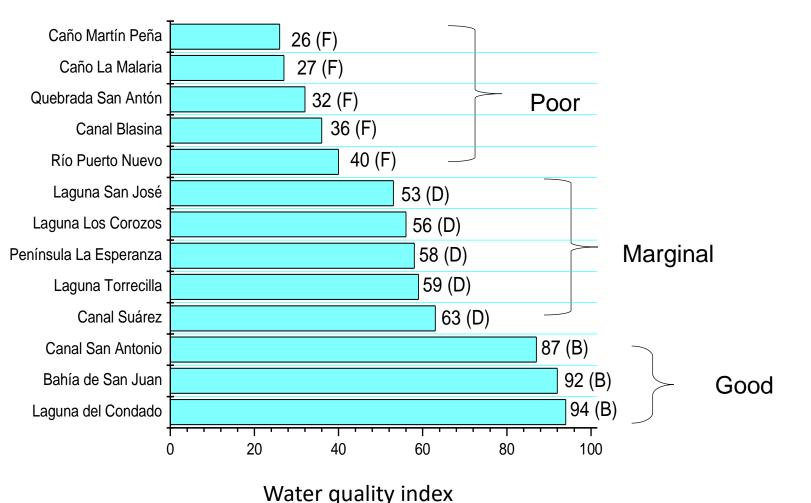
## Water Quality Index/Score Card Guidelines

- Developed by the British Columbia Ministry of Environment, Lands and Parks\*.
- The Index incorporates 3 elements:
  - Scope: The number of variables not meeting water quality objective.
  - Frequency: The number of times these objectives are not met.
  - Amplitude: The amount by which the objectives are not met.

| Parámetro de calidad de agua                   | Valor objetivo  |
|--|-----------------|
| Oxígeno disuelto                               | 4 mg/           |
| Turbidez                                       | 10 NTU          |
| Transparencia del agua<br>(profundidad Secchi) | 1 metro         |
| Aceites y grasas                               | 1 mg/L          |
| Nitrógeno total                                | 1 mg/L          |
| Nitratos y nitritos                            | 0.5 mg/L        |
| Fósforo total                                  | 0.5 mg/L        |
| Carbón orgánico total                          | 5 mg/L          |
| Clorofila a                                    | 5 mg/L          |
| Demanda biológica de oxígeno                   | 5 mg/L          |
| Coliformes fecales<br>(media geométrica)       | 200 CFU*/100 ml |
| Enterococcus<br>(media geométrica)             | 35 CFU*/100 ml  |

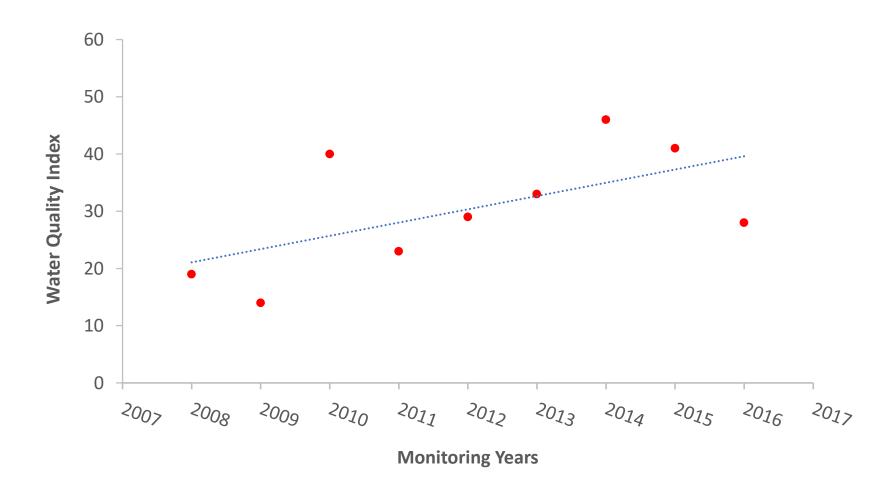
\*Canadian Water Quality Guidelines for the Protection of Aquatic Life, 2001.

## SJBE Water Quality Index & Scores



Water bodies

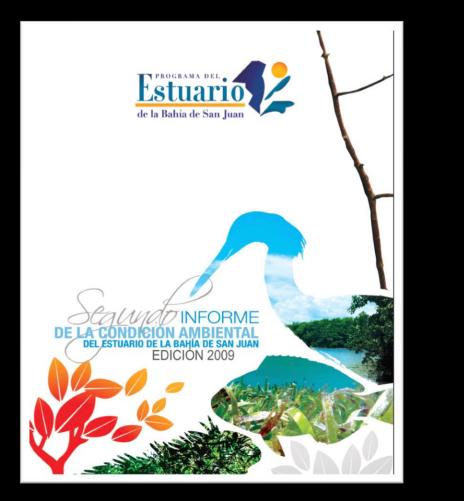
#### Caño Martín Peña Water Quality Index Trend

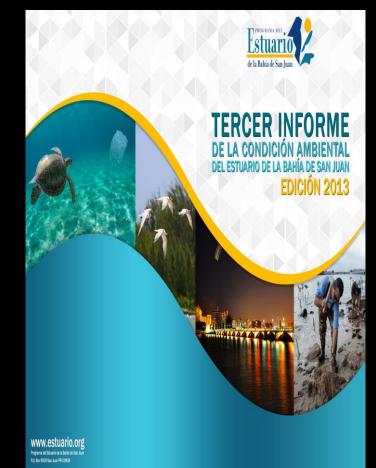


We need to Restore Water Circulation & Improve Sanitary Infrastructure = Caño Martín Peña Restoration



# Next State of the Bay report coming in 2017.





### **MUCHAS GRACIAS !**

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