

# RECLAMATION

*Managing Water in the West*

## **CVP Cost Allocation Allocation Approach**

**Public Meeting**

**July 18, 2014**



U.S. Department of the Interior  
Bureau of Reclamation

# CVP Cost Allocation Study

## Meeting Purpose and Agenda

- Purpose:
  - Present Preferred Water Supply Benefit Methodologies
  - Explain Allocation Process & Assumptions
- Agenda:
  - History (Previous Information)
  - Review Definitions & Process
  - Use of Hydrology Info to Allocate Costs
  - Looking Forward

# Cost Allocation Process

## Benefit Methodologies

- **Irrigation: State Water Agricultural Production (SWAP) model**
- **M&I:**
  - **California Municipal Demand Model (CMDM)**
  - **Least Cost Planning Simulation Model & Other Municipal Water Economics Model (LCPSIM & OMWEM)**
  - **Water User Conservation Plan Action Costs**
- **Refuge Water: SWAP model**  
**Value of most likely alternative use – represents a lower bound of benefit**

# Cost Allocation Process

## Key Definitions Used

- **Justifiable Expenditure** (defines the maximum allocation to any one purpose) = the lesser of:
  - **Present worth of the stream of benefits generated by the multi-purpose project**
  - OR**
  - **Cost of a single-purpose alternative designed to provide the same benefit stream**

# Cost Allocation Process

## Key Definitions Used – con't

### ➤ Single Purpose Alternative Cost (SPA)

- The least cost alternative which would likely be built as a federal single-purpose project that provides the same level of benefits for any one specific purpose as the multi-purpose project.

### ➤ Separable Cost = Minimum Allocation

- The cost which would be omitted from total project cost if one purpose were to be excluded and the same project plan were retained for the rest of the purposes.

# Cost Evaluation Procedure

## Single-Purpose Facility

### Example Facility

| Original Data            |  |                                       | Adjusted Capital Costs   |  |   |                                  |  |   |
|--------------------------|--|---------------------------------------|--|--|---|----------------------------------|--|---|
| Fiscal Year <sup>1</sup> | Cumulative Capital Total Cost to Date <sup>2</sup> | Fiscal Year Capital Cost <sup>3</sup> | Distributed Differential Fiscal Year Capital Cost <sup>4</sup> | Adjusted Fiscal Year Capital Cost <sup>5</sup> | Adjusted Cumulative Capital Cost <sup>6</sup> | BCI <sub>Year</sub> <sup>7</sup> | BCI Fiscal Year Differential Capital Cost <sub>2010</sub> <sup>8</sup> | Projected Capital Cost to Date <sup>9</sup> |
| 1980                     | \$35,000,000                                       | \$35,000,000                          | \$0  | \$35,000,000                                   | \$35,000,000                                  | 1,941                            | \$88,049,974   | \$88,049,974                                |
| 1988                     | \$45,000,000                                       | \$10,000,000                          | (\$2,000,000)  | \$8,000,000                                    | \$43,000,000                                  | 2,598                            | \$15,036,182   | \$103,086,156                               |
| 1989                     | \$46,000,000                                       | \$1,000,000                           | (\$1,000,000)  | \$0  | \$43,000,000                                  | 2,634                            | \$0  | \$103,086,156                               |
| 1998                     | \$43,000,000                                       | (\$3,000,000)                         | \$0  | \$0  | \$43,000,000                                  | 3,390                            | \$0  | \$103,086,156                               |
| 1999                     | \$45,000,000                                       | \$2,000,000                           | \$0  | \$2,000,000                                    | \$45,000,000                                  | 3,456                            | \$2,826,151  | \$105,912,307                               |
| 2000                     | \$47,000,000                                       | \$2,000,000                           | \$0  | \$2,000,000                                    | \$47,000,000                                  | 3,539                            | \$2,759,212  | \$108,671,519                               |
| 2001                     | \$50,000,000                                       | \$3,000,000                           | (\$500,000)  | \$2,500,000                                    | \$49,500,000                                  | 3,574                            | \$3,415,959  | \$112,087,478                               |
| 2002                     | \$49,500,000                                       | (\$500,000)                           | \$0  | \$0  | \$49,500,000                                  | 3,623                            | \$0  | \$112,087,478                               |
| 2003                     | \$51,000,000                                       | \$1,500,000                           | \$0  | \$1,500,000                                    | \$51,000,000                                  | 3,693                            | \$1,983,168  | \$114,070,646                               |
| 2004                     | \$53,000,000                                       | \$2,000,000                           | \$0  | \$2,000,000                                    | \$53,000,000                                  | 3,984                            | \$2,451,203  | \$116,521,848                               |
| 2005                     | \$55,500,000                                       | \$2,500,000                           | \$0  | \$2,500,000                                    | \$55,500,000                                  | 4,205                            | \$2,902,976  | \$119,424,825                               |
| 2006                     | \$58,000,000                                       | \$2,500,000                           | \$0  | \$2,500,000                                    | \$58,000,000                                  | 4,369                            | \$2,793,904  | \$122,218,729                               |
| 2007                     | \$60,500,000                                       | \$2,500,000                           | \$0  | \$2,500,000                                    | \$60,500,000                                  | 4,485                            | \$2,721,648  | \$124,940,378                               |
| 2008                     | \$62,500,000                                       | \$2,000,000                           | \$0  | \$2,000,000                                    | \$62,500,000                                  | 4,691                            | \$2,081,896  | \$127,022,274                               |
| 2009                     | \$63,800,000                                       | \$1,300,000                           | \$0  | \$1,300,000                                    | \$63,800,000                                  | 4,769                            | \$1,331,099  | \$128,353,373                               |
| 2010                     | \$65,000,000                                       | \$1,200,000                           | \$0  | \$1,200,000                                    | \$65,000,000                                  | 4,883                            | \$1,200,000  | \$129,553,373                               |

BCI<sub>2010</sub>: 4,883

Original Capital Cost: **\$65,000,000**

Projected Capital Cost: **\$129,553,373**

# Cost Allocation Process

## Key Definitions Used – con't

- **Base Year: Establishes a Common Price Level.**
  - **A point in time selected for the purpose of maintaining a consistent price level relationship for costs & benefits that occur at different points in time.**
  - **Both benefits and costs need to be estimated at a common price level to allow consistent comparison and computation of values.**

# Process for Cost Evaluation

## Cost Index Comparison: *Concrete Dams*

| Year |   | ENR BCI |  |
|------|---|---------|--|
|      |   | Index   |  |
| 1940 |   | 242     |  |
| 1950 |   | 510     |  |
| 1960 | \$1,000 spent to construct a concrete dam in 1960 is the equivalent of spending \$1,676 in 1970 dollars.<br>$1381 \div 824 = 1.67597$ | 824     |  |
| 1970 |   | 1381    |  |
| 1980 | \$3,928 in 1980 dollars   | 3237    |  |
| 1990 | \$5,743 in 1990 dollars   | 4732    |  |
| 2000 | \$7,550 in 2000 dollars   | 6221    |  |
| 2010 | \$10,682 in 2010 dollars  | 8802    |  |

# Cost Allocation Process

## Key Definitions Used – con't

- **Separable costs include the cost of both single purpose features as well as some portion of multi-purpose facilities.**
  - **Single purpose facilities: Features designed to serve only one project purpose.  
Examples: Power plant & penstock or water supply canal or pipeline.**
  - **Multi-purpose facilities: The reduction in the cost of multi-purpose features if one purpose were excluded.  
Example: Dam & reservoir.**

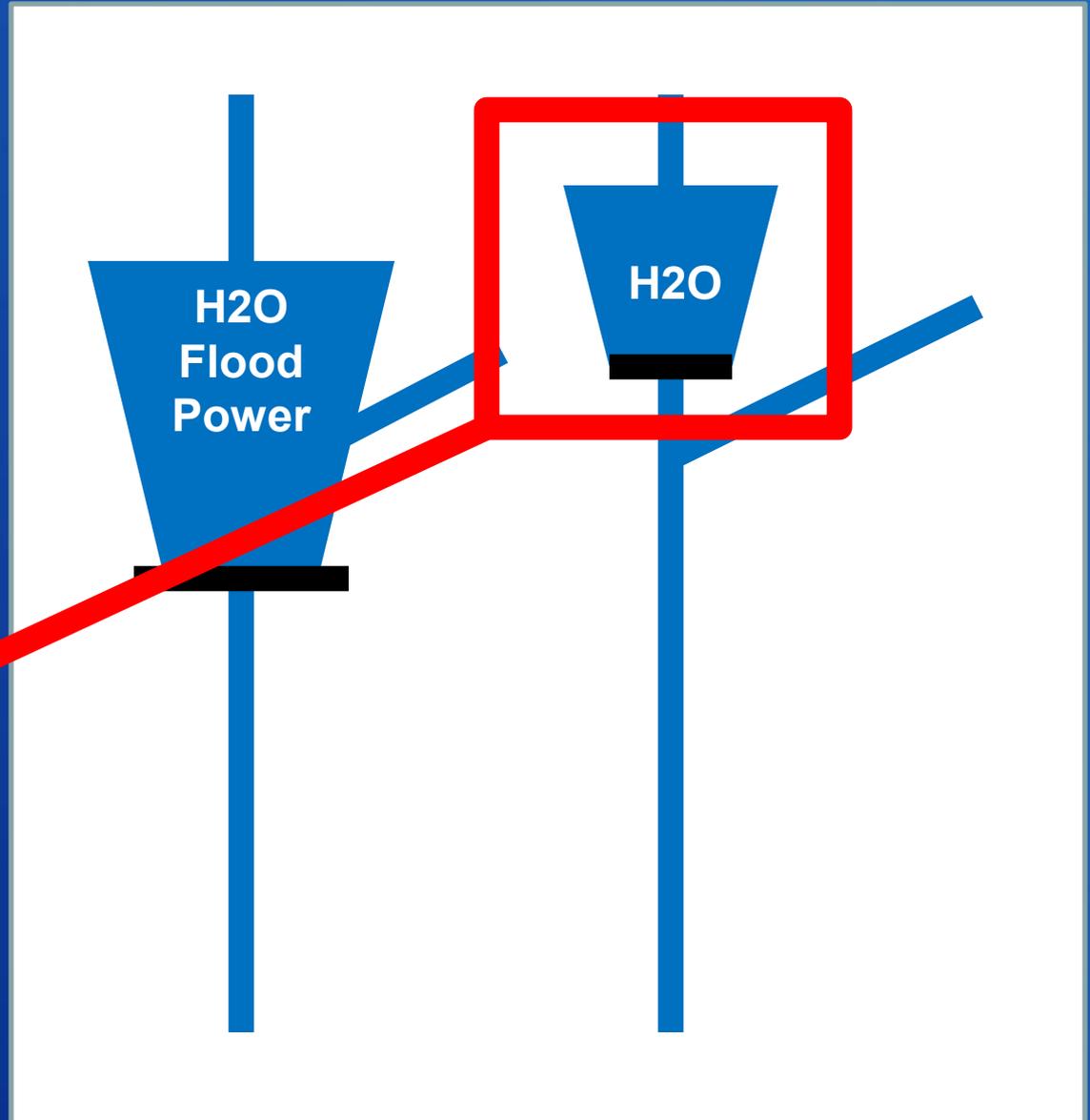
# Cost Allocation Process

**Step 1: Estimate the monetary benefits provided by each project purpose and the single-purpose alternative cost of each purpose.**

- **Benefits and costs are estimated at the base year price level for comparison purposes.**
  - **Benefits are typically valued at the base year price level**
  - **Costs are typically indexed to the base year**

# Single Purpose Concept

“What size facility is required to satisfy **ONLY** the water supply purpose?”



RECLAMATION

# Cost Allocation Process

## Step 2: Determine Justifiable Expenditure

- Choose the lesser of the cost of the single-purpose alternative or the benefits for that purpose to determine the justifiable expenditure for each purpose.

# Cost Allocation Process

## Step 3: Estimate separable costs and determine remaining justifiable expenditure

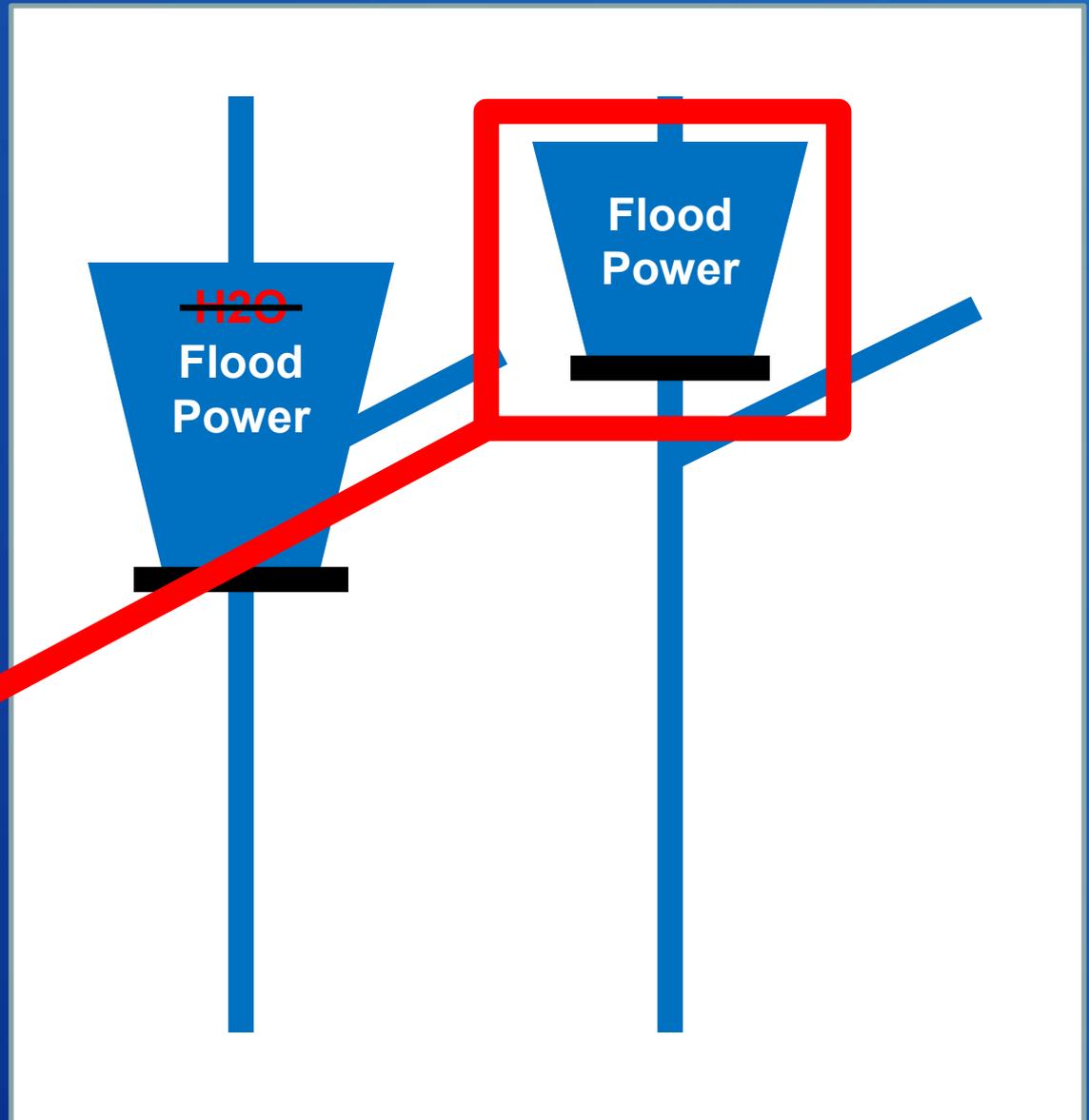
- Separable costs include the savings from:
  - Eliminating all single purpose features for each purpose
  - Reducing the size of multi-purpose features when a single purpose is eliminated.
- Subtract separable costs from justifiable expenditure to determine remaining justifiable expenditure for each purpose.

# Separable Cost Concept

“What size facility  
is required to  
satisfy

**everything**  
**EXCEPT**

the water supply  
purpose?”



# Cost Allocation Process

**Step 4: Calculate the proportionate share of remaining justifiable expenditures for each purpose.**

**Step 5: Calculate the remaining joint costs by subtracting the total of all separable costs from the total project costs.**

# Cost Allocation Process

**Step 6: Allocate the remaining joint costs among the project purposes according to the percentages derived in Step 4.**

**Step 7: Calculate the total costs allocated to each purpose. This is done by adding the separable costs for a given purpose and the remaining joint costs allocated to that purpose.**

Questions?

RECLAMATION