

BENEFITS DERIVATION FOR
AN APPRAISAL LEVEL STUDY

BENEFITS ESTIMATED

- A) Agricultural
- B) Recreation
- C) Flood
- D) Regional

Agricultural Benefits

- 2 Methodologies that can be used
 - 1) Variable Yield / Constant Acreage
 - 2) Constant Yield / Variable Acreage

Variable Yield / Constant Acreage Example

Use Yield Estimation Model developed by UNL

*Based on losing one or two
acre-inches*

Step 1: Start with County Average or, if available, district-level average yields

Table 1. Average Irrigated Yields, 1991-95.

	UNIT	Irrigated Corn Yields					AVG
		1991	1992	1993	1994	1995	
District/County A	Bushel	166.0	N/A	153.4	135.8	163.9	154.8
District/County B	Bushel	156.2	N/A	156.2	133.3	162.5	152.0
Average							153.4

Step 2: Obtain the changes in irrigation water available under each selected alternative. Estimate yields under each alternative.

Table 2. Estimated Yields for the Selected Water Supply Range.

Alternative Name	Inches of Water Applied	Corn Yield
Baseline	11.5	154.5
A	11.7	155.2
B	12.0	156.2
C	12.2	156.8

Step 3: Estimate changes in net farm revenues under each scenario:

Table 3. Calculation of Gross and Net Revenues

	Baseline	A	B	C
Yield	154.5	155.2	156.2	156.8
Normalized Price	\$2.25	\$2.25	\$2.25	\$2.25
Gross Revenues	\$347.55	\$349.12	\$351.37	\$352.81
Variable Op Costs	\$135.54	\$135.54	\$135.54	\$135.54
Custom Harvest Costs				
Trucking	\$20.08	\$20.17	\$20.30	\$20.38
Net Income	\$191.93	\$193.41	\$195.53	\$196.89
Change in Net Revenue from Baseline		\$ 1.47	\$ 3.60	\$ 4.96

Step 4: Multiply the net revenues by the number of affected acres; usually a constant but can vary depending on the circumstances.

Step 5: Select an appropriate discounting period and discount rate; find the net present value of each alternative

Table 4. Incremental Irrigation Benefits for Each Alternative.

Alternative	Baseline Benefits For All Acres	Alternative Benefit For All Acres	Incremental Net Present Value Relative to the Baseline
Baseline	\$ 213,064,200		
Alt A		\$ 214,703,193	\$ 1,638,993
Alt B		\$ 217,056,592	\$ 3,992,391
Alt C		\$ 218,566,319	\$ 5,502,118

Step 6: If needed/wanted, obtain relevant costs to implement each alternative and then calculate a Benefit-Cost Ratio.

Constant Yield / Variable Acreage Example

Farmer decides to fully irrigate some acres, fallow some acres.

Step 1: Start with County Average or, if available, district-level Yields

Step 2: Costs of production remain constant across alternatives

Step 3: Project "With" and "without" cropping patterns

Table 1. Typical Farm Cropping Patterns for the "With" and "Without" Project Conditions.

	WITH PROJECT CROPPING PATTERN			
	Acres	Crop Yield	Yield Units	Price Received
Irrigated Crops				
Corn	184	142.40	Bu	\$2.53
Alfalfa	18	4.82	Ton	\$70.17
Estab. Alfalfa	3	3.62	Ton	\$70.17
Soybeans	30	45.67	Bu	\$5.76
Dryland Crops				
Wheat	156	39.96	Bu	\$3.39
Eco-Fallow Corn	156	83.89	Bu	\$2.53
Fallow	158	0	N/A	0
Pasture	650	.64	AUMs	\$18.13
<hr/>				
	WITHOUT PROJECT CROPPING PATTERN			
	Acres	Crop Yield	Yield Units	Price Received
Dryland Crops				
Wheat	234	39.96	Bu	\$3.39
Eco-Fallow Corn	234	83.89	Bu	\$2.53
Fallow	237	0	N/A	\$0
Pasture	650	.64	AUMs	\$18.13

"with" project cropping pattern may have to be adjusted to fit the "future with" conditions. This information is subjective and will rely on local expertise.

Step 4: Derive Farm budget estimates of farm net revenues. May use Reclamation's budget generator, or may use another less rigorous partial budgeting approach. Have historical Reclamation budgets available, so can just update and save some time in the analysis.

Step 5: Obtain relevant costs to implement each alternative: O&M, implementation costs, etc

Step 6: Summarize acres affected, benefits, and costs

Table 2. Summary of Annual Irrigation Benefits and O&M Costs by Facility.

LAKE	ACRES SERVED	ANNUAL BENEFITS	ANNUAL O&M COSTS	RESIDUAL BENEFITS
Lake A	23,037	\$823,112	\$666,903	\$156,209
Lake B	4,969	\$177,542	\$143,842	\$33,700
Lake C	17,165	\$613,306	\$496,908	\$116,398

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Recreation Benefits

Will be estimated by Jon Platt.

he does this a lot

Historical information is available from the Republican River contract renewal studies. Jon will attempt to update available information and will concentrate on Enders Dam

Information needed:

- A) End-of-month Lake Water elevations
- B) Recreation facilities, i.e., boat ramps, campgrounds, picnic grounds, etc
- C) Elevation at which facilities are unusable, either inundated or water level too low
- D) Present use of facilities – Recreation days, etc
- E) If available (it usually isn't) substitution patterns of recreation. Where will the recreators go if Enders is not open?

Step 1: Estimate recreation use on the lake under each alternative given the change in end-of-month lake elevations.

Step 2: Try to estimate substitution patterns for recreators (maybe – this is tough to do)

Step 3: Compare among alternatives the costs and benefits of each

Flood Damage Abatement Benefits

Step 1: Obtain historical data from Reclamation-published AOP

Step 2: Report it.

Regional Benefit Analysis

@ the appraisal level they typically don't do this

Step 1: Update and/or obtain new Regional Analysis Data from IMPLAN corporation

Step 2: Input agricultural and recreation information into the regional model

Step 3: Estimate changes in income, labor, and multiplier effects for the selected area of interest.

Looks @ how domino effects fall out from Agri-business being down -