

RECLAMATION

Managing Water in the West



**Odessa Subarea Special Study
Columbia Basin Project**

PLAN OF STUDY



*U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Upper Columbia Area*

February 2006

Mission Statements

United States Department of the Interior

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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ACRONYMS

ac-ft/yr	acre-feet per year
BiOp	Biological Opinion
BPA	Bonneville Power Administration
CBIP-RW	Columbia Basin Irrigation Project RiverWare
CBP	Columbia Basin Project
cfs	cubic feet per second
CRI	Columbia River Initiative
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
ECBID	East Columbia Basin Irrigation District
Ecology	Washington State Department of Ecology
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year
GIS	Geographic Information System
GWMA	Ground Water Management Area
H.Doc. No. 172	House Document No. 172
ITAs	Indian Trust Assets
M&I	Municipal and Industrial
MOU	Memorandum of Understanding
MWSC	Master Water Service Contract
NED	National Economic Development
NEPA	National Environmental Policy Act
OMB	Office of Management and Budget
OM&R	Operations, Maintenance & Repair
P&Gs	Principles and Guidelines (Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies)
PASS	Project Alternative Solutions Study
POS	Plan of Study
Project	Columbia Basin Project
Q-CBID	Quincy-Columbia Basin Irrigation District
Reclamation	Bureau of Reclamation
RED	Regional Economic Development
SCBID	South Columbia Basin Irrigation District
Secretary	Secretary of the Interior
State	State of Washington
Study	Odessa Subarea Special Study
TCP	Traditional Cultural Property
USGS	U.S. Geological Survey
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

Reclamation's Odessa Subarea Special Study (Study) will investigate the possibility of continuing development of the Columbia Basin Project (hereinafter referred to as CBP or Project) to deliver Project water to lands currently using groundwater in the Odessa Ground Water Management Subarea (Odessa Subarea). This Study will not address full completion of the Project, but does not preclude Reclamation from considering this in the future.

The Washington State Department of Ecology (Ecology) issued temporary permits to the groundwater irrigators in the 1960s and 1970s assuming that CBP water would eventually serve these lands. Reclamation has previously investigated providing Project water to this area, but for various reasons development has not occurred. The Odessa Subarea aquifer is experiencing significant declines putting irrigation at risk. The State of Washington (State), Project irrigation districts, and local constituents have advocated that Reclamation investigate providing CBP water to groundwater irrigators to help reduce demands on the aquifer. The State has agreed to partner with Reclamation by helping to fund and collaborate on various study components.

This Plan of Study (POS) describes how Reclamation will develop and evaluate alternatives to address the declining Odessa Subarea aquifer. The document provides information about the study objectives, requirements, time lines, and funding considerations. This in turn has helped determine the technical skills and study team members needed to successfully complete the study. The POS should be considered an interim document that will be revised, as necessary, throughout the Study to respond to new information and issues that arise.

1.1 Background

The CBP was authorized for the irrigation of 1,029,000 acres. Currently, about 671,000 acres (platted farm units 557,530 acres, water service contracts 73,227 acres, Quincy Ground Water Subarea license 40,323 acres) are served by the Project; most development occurred primarily in the 1950s and 1960s and some acreage was added sporadically until 1985.

Prior studies on the merits of continued development of the CBP have occurred. Most recently, Reclamation completed a Draft Environmental Impact Statement (DEIS) in 1989 and a Supplemental DEIS in 1993. In 1994, Reclamation placed this study on hold. Around the same time Reclamation placed a self-imposed moratorium on additional water withdrawals from the Columbia River because it was purchasing and leasing Snake River water to augment Snake and Columbia River flows to aid migrating anadromous fish. Reclamation lifted the moratorium in 2003 after a biological opinion addressing operations of the Federal Columbia River Power System, which includes the CBP, was issued.

The Odessa Subarea is a groundwater management area designated by Ecology of approximately 2,000 square miles that underlies the eastern most portion of the authorized CBP, east of the East Low Canal. It contains a series of basalt flows known as the Columbia River Basalt Group. Since 1967, the Odessa Subarea has experienced declines (WAC 173-128A). These declines were correlated with increased irrigation pumping (*Jenkins et al. v. State of Washington*,

Department of Ecology PCHB No. 02-023 and 02-026 – Findings of Fact, Conclusions of Law and Order). Groundwater withdrawals from the Odessa Subarea are regulated by special rules contained in Chapter 173-130A WAC.

Ecology began permitting irrigation wells in the Odessa Subarea in the 1960s and 1970s anticipating the completion of the CBP. Irrigators were advised that this source would not be permanent, but anticipated that the CBP would continue to be developed, eventually replacing ground water with surface water. This aquifer is currently being depleted by irrigation wells to such an extent that the ability of farmers to irrigate their crops is at risk and detrimental effects to other water resources are also occurring. Groundwater users must pump from great depths at great expense or abandon irrigated farming. Further, aquifer water quality is declining. Municipalities rely on the aquifer as well.

Project irrigation districts, local and State governments, and other local interest groups support provision of CBP water to the groundwater irrigators as a means of alleviating demands on the aquifer. In response to requests from constituents, Congress provided appropriations in Reclamation's Washington Investigations Program for fiscal years (FY) 2005 and 2006 to investigate the Odessa Subarea.

1.2 Columbia Basin Project

The CBP is located in central Washington and currently serves a total of about 671,000 acres in Grant, Lincoln, Adams, and Franklin Counties. The Project is multi-purpose, providing irrigation, power production, flood control, municipal water supply, recreation, and fish and wildlife benefits. The CBP includes 330 miles of main canals, 1,990 miles of smaller canals, and 3,500 miles of open drains and wasteways served by more than 240 pumping plants.

Three irrigation districts receive Project water, including Quincy-Columbia Basin Irrigation District (Q-CBID), East Columbia Basin Irrigation District (ECBID), and South Columbia Basin Irrigation District (SCBID), serving 247,122 acres, 152,000 acres, and 232,000 acres respectively. Reclamation along with these irrigation districts operate and maintain the Project. Transferred works are facilities owned by Reclamation, but operated and maintained by an irrigation district or other entity. These include basic irrigation facilities such as canals, laterals, wasteways, and pumping plants. Reserved works, irrigation facilities that are operated by Reclamation, include Grand Coulee Dam and Powerplant and Pumping Plant, Banks Lake, Dry Falls Dam, Main Canal, Potholes Reservoir, and Potholes Canal headworks.

The Grand Coulee Dam, the key structure for the CBP, is located on the main stem Columbia River. The Grand Coulee Pump-Generating Plant lifts water about 280 feet from Franklin D. Roosevelt Lake (also known as Lake Roosevelt) to Banks Lake, which serves as an equalizing reservoir for the irrigation system. The Main Canal transports flow southward from Banks Lake to Dry Falls Dam to the northern end of the irrigable area. This canal feeds into the East Low and West Canals, which carry water over a large portion of the Project area. In the central part of the Project, O'Sullivan Dam, creating Potholes Reservoir, receives return flows from the

northern part of the Project. The Potholes Canal begins at O’Sullivan Dam and runs south to serve the southern part of the Project.

Reclamation has expended considerable effort in investigating the phased development of the CBP. The Feasibility Report submitted to the Secretary of the Interior (Secretary) to authorize construction anticipated a 71-year development period (House Document No. 172, 1945). Attachment A summarizes the numerous studies and activities that have occurred relative to project development.

Following signing of a Master Water Service Contract (MWSC) between Reclamation and irrigation districts in 1976, it was anticipated that the CBP development would continue using a phased approach. Full project development (up to 1,029,000 acres served) was contemplated with the construction of the second Bacon Siphon and Tunnel in 1980. Enlargement of the Main Canal in 1981 made available adequate capacity to provide water service to a fully developed CBP. For numerous reasons, a fully developed CBP has not been implemented in an expedient manner because of shifting national priorities and concern over endangered fish species and the associated moratorium on additional withdrawals from the Columbia River.

1.3 Study Purpose and Scope

Reclamation’s Odessa Subarea Special Study will investigate the continued incremental development of the CBP, focusing on lands within authorized Project boundaries currently being irrigated with ground water in the Odessa Subarea. The Study focus is consistent with the policy and priorities that Reclamation’s Pacific Northwest Regional Director identified when announcing the decision to lift the Columbia River withdrawal moratorium. Immediate priorities identified for future CBP development included addressing pressing municipal and industrial (M&I) water supply needs and issues associated with depletion of the Odessa Subarea aquifer. Any solutions that relieve irrigation pressures on the groundwater will benefit M&I uses.

The Study will examine alternatives that

- reduce irrigation use of the Odessa Subarea aquifer;
- maximize the use of existing Project infrastructure;
- do not preclude full development of the Columbia Basin Project in the future;
- are economically justified, financially feasible, and environmentally acceptable; and
- can be studied with available funding.

1.4 Study Area

The study area is generally defined by those lands determined to have development potential by previous Reclamation investigations, coinciding with the Odessa Subarea boundary defined by Ecology (see figure 1). In figure 1, this area encompasses the area defined in the yellow and overlain by the blue cross hatch. These lands are located in Adams, Grant, and a small portion of

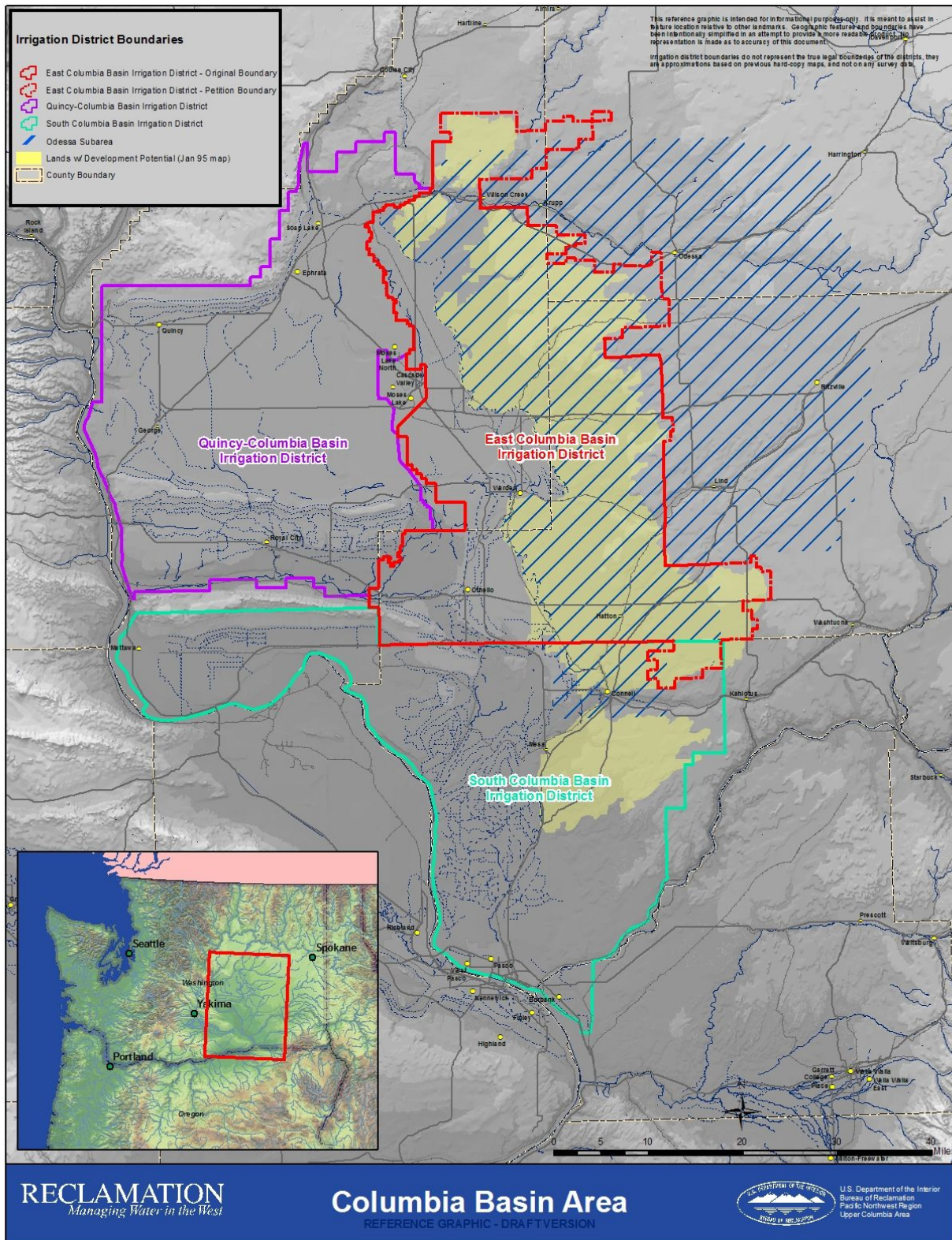


Figure 1.1. Study Area

Franklin and Lincoln Counties. The study area is within the CBP boundary and is generally defined by the area bounded on the west by the Project's East Low Canal, on the east by the City of Lind, and extending north to Wilson Creek and south to the Connell area.

1.5 Project and Study Authorities

This Study is conducted under the authority of the Columbia Basin Project Act of March 10, 1943, as amended, and the Reclamation Act of 1939. The Grand Coulee Dam Project was authorized for construction by the Act of August 30, 1935, and reauthorized and renamed in the Columbia Basin Project Act of March 10, 1943.

The 1943 Act subjected the CBP to the requirements of the Reclamation Project Act of 1939. Section 9(a) of the 1939 Act gave authority to the Secretary to approve a finding of feasibility and thereby authorize construction of a project upon submitting a report to the President and the Congress. Transmittal of House Document No. 172 (H. Doc. No. 172)¹ to the President on March 27, 1945, and then to the House Irrigation and Reclamation Committee fulfilled these requirements. When the Secretary recommended a project to Congress, the feasibility report and Reclamation's Regional Director's report were customarily printed as a House Document. A Department of the Interior Solicitor's opinion² has also concluded that the feasibility requirements of Section 9(a) for irrigation development of the CBP were met in 1945 upon the transmittal of H. Doc. No. 172 to the President and Congress.

Repayment contracts for the Project state that Reclamation is authorized by the Secretary to continue phased development of the CBP as long as the Secretary makes a finding of economic and financial feasibility. Although a feasibility report was completed and submitted by the Secretary in 1945, this Study will conduct a feasibility-level analysis as it is anticipated that the Office of Management and Budget (OMB) and other decision makers may require this level of analysis before appropriations for new construction will be made. Further, this study approach will help the Secretary determine the financial and economic feasibility of a preferred alternative as stipulated in current contract provisions with Project beneficiaries.

1.6 Previous Investigations

Reclamation and others have engaged in numerous studies and investigations related to the study purpose described here or conducted in the study area that may provide useful information for this Study. Some of these are summarized here. Attachment A provides a more comprehensive listing.

¹ House Document 172, 79th Cong., 1st Sess., *Joint Report on Allocation & Repayment of the Costs of the Columbia Basin Project*, Reclamation Report of Oct. 30, 1944, approved by the Secretary on Jan. 31, 1945.

² Solicitor Opinion (Frank Barry) M-36626, 68 I.D. 305, July 11, 1961, pg. 5.

1.6.1 Studies and Investigations Conducted By Reclamation

Columbia Basin Project Definite Plan Report, March 1953.

The report outlines the general plan of development for the CBP, including engineering and financial feasibility of the Project, and functions as the reference in preparing detailed plans and specifications for implementing and carrying out orderly development. The report describes eventual irrigation of 1,029,000 acres with development to occur over several decades.

Special Report - East High Investigations, Columbia Basin Project, April 1968.

This special report examined the completion of the CBP to serve 1,095,000³ irrigable acres. The proposed plan of development included using full capacity of existing facilities, constructing additional units at Grand Coulee Pumping Plant and a second Bacon Siphon and Tunnel, and enlargement of East Low and West Canals. The study investigated enlarging the acreage served by the proposed East High Canal to 385,000 acres to achieve optimum use of available water resources. The Definite Plan Report originally anticipated serving 191,000 acres in this area. Numerous studies followed this special report to implement the proposed plan of development.

Final Environmental Impact Statement (FEIS), Columbia Basin Project - Volumes 1 and 2, February 1976.

The FEIS provides an overview of CBP development begun in 1933 and describes impacts associated with the existing facilities and features and anticipated effects of proposed CBP development for the remaining 568,000 acres. The document describes several separate studies and reports that will be prepared to investigate the feasibility of continued development of the CBP, including the East Low and East High Extension areas.

Lands Report for Completion of the Columbia Basin Project, February 1976.

This report was prepared to guide future development of the second half of the CBP. Lands investigated are described as Deferred and Bypassed and East High and East Low Extension lands. The report documents soils studies for undeveloped lands and economic land classifications. Field work was conducted in 1970.

Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Limited Irrigation Development on Columbia Basin Project, 1982.

Reclamation, ECBID, and Q-CBID worked on a limited development plan and negotiated a supplement to the MWSC, giving the two irrigation districts the right to subcontract with landowners to pump and transport water from existing canals to a maximum of 10,000 acres for each district. The proposed action entailed development of 10,000 acres in Q-CBID with modification to the West Canal (water to Deferred and Bypassed lands), and 10,000 acres in ECBID without canal modification (eastern upland, east of developed portion of CBP). This effort stimulated interest in additional development of the Project as demand for water in the ECBID exceeded the 10,000 acres authorized by this effort. The ECBID formally requested that Reclamation proceed with completion of the CBP.

³ Although some Reclamation reports mention that the CBP could serve up to 1,095,000 acres, Congress has authorized the CBP for 1,029,000 acres.

Continued Development of the Columbia Basin Project – Draft Environmental Impact Statement (DEIS), 1983-1993.

Reclamation formally initiated the environmental process to consider the continued, orderly development of the CBP when it published a Notice of Intent to prepare an EIS in December 1983. The DEISs prepared for the development of the second half of the CBP include:

- *DEIS for Second Half of Columbia Basin Project, 1989*
- *DEIS Continued Development of the Columbia Basin Project, Washington, September 1989*
- *Supplement to the Draft EIS – Continued Development of the Columbia Basin Project, Washington, September 1993*

Numerous reports and documents supporting the technical studies and economic analyses are also available. The alternatives considered ranged from full development of the second half of the Project to a phased approach. A Supplement to the 1989 DEIS was prepared to examine new information or analyze issues in more detail, including an anadromous fish plan, a fish and wildlife plan, and water withdrawal effects to Lake Roosevelt. The preferred alternative was to provide Project water to 87,000 acres near or adjacent to the East Low Canal within ECBID and SCBID. Of these lands, 41 percent (35,700 acres) were lands currently irrigated using ground water or with interruptible service and 59 percent (51,300 acres) were dryland farmed.

DRAFT, Water Conservation Steering Committee Report, September 24, 1987.

The Water Conservation Steering Committee was established during preparation of the DEIS for Continued Development of the CBP (described above). The Committee was formed to make recommendations regarding a water conservation proposal to be incorporated into the DEIS.

1.6.2 Studies and Investigations Conducted By Others

Odessa Groundwater Basalt System, US Geological Survey (USGS), 1975.

USGS in cooperation with Ecology developed and completed a computer model of the Odessa Groundwater Basalt system in 1975. This model was revised in 1982 using a standard USGS two-dimensional model to predict area water level decline.

Preliminary Socioeconomic Analysis: Second Half of the Columbia Basin Project, Washington Department of Ecology, 1985.

Concurrent with Reclamation's investigations of the continued development of the CBP from 1983 through 1989, Ecology published the above referenced report in March 1985. The report analyzed the impacts related to full development of the second half of the CBP. Ecology also developed a plan for the Odessa subarea ground water management unit.

Columbia Basin Ground Water Management Area (GWMA) Plan, December 2001.

The Columbia Basin GWMA was formed by locally elected leaders and citizens of Adams, Franklin, and Grant Counties in 1997 in response to data that indicated the presence of nitrate concentrations in ground water above what is considered naturally occurring levels. In 1998, Ecology formally designated the three-county area as a GWMA and provided a State-sponsored

method for local citizens and government to work together to develop a GWMA Plan. Studies and associated data and reports prepared by this effort overlap the study area for Reclamation's Study. Documents and Geographic Information System (GIS) data are available including:

- *Hydrogeological Characterization Report - The Columbia Basin Ground Water Management Area*, Concurrence Review Draft, Kennedy/Jenks, June 2001.
- *Hydrogeologic Setting of The Columbia Basin Ground Water Management Area - Summary Report*, Daniel B. Stephens & Associates, Inc., revised Kennedy/Jenks Consultants, December 2000.
- *Geology and Hydrogeology Publication Bibliography*, Daniel B. Stephens & Associates, Inc., June 2001.
- *Mean Nitrate Concentrations In Wells*, Jones and Wagner, 1995.

Water Supply, Use and Efficiency Report, Columbia Basin Project, Montgomery Water Group, September 2003. This was a joint effort prepared for the three CBP irrigation districts and Reclamation comparing Project water use and efficiency trends for the 1969 through 1996 period.

The Economic Impact of Possible Irrigation-Water Shortage in Odessa Sub-basin: Potato Production and Processing, June 2005. Prepared by the Washington State University on behalf of the Washington State Potato Commission, this study examined the potential economic effects from continued decline of the aquifer in the Odessa Subarea. The study concluded that in the worst case scenario the estimated regional impact would be a loss of regional sales of roughly \$630 million annually.

2.0 STUDY CONSIDERATIONS AND ISSUES

There are numerous issues, summarized below, that were considered in developing a study process and time line. As these or other considerations evolve or are resolved, it may be necessary to adjust the study process. The success of this effort is also dependent on the ability to be flexible enough to adjust to changing political and internal policy changes that may occur throughout the Study.

2.1 Finding of Financial and Economic Feasibility

Congress approved, through the Act of October 1, 1962, the terms and proposed development in Article 6 of the Amendatory Repayment Contract with Q-CBID, which describes the plan to continue irrigation development (Congress directed Reclamation to enter into similar contracts with ECBID and SCBID). In 1968, the 1962 Amendatory Repayment Contract was amended. Other than adjusting the irrigable acreage served by Project works and removing the limits on the amount to be expended for construction of Project works directly assigned to irrigation, the remainder of Article 6 is essentially the same in the 1962 and the 1968 repayment contracts, and still in effect as originally entered into in 1945. Article 6(c) notes that “The U.S. will continue construction of irrigation project works to serve District lands as long as the continuation is within such cost limits of economic and financial feasibility as may be determined by the Secretary” Contracts with ECBID and SCBID contain similar language.

Reclamation traditionally determines economic feasibility through benefit-cost ratio and financial feasibility through payment capacity analyses. In the most recent study examining continued development of the CBP (1983-1993 Continued Development of the Columbia Basin Project - DEIS), criteria contained in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (Water Resources Council 1983), also known as Principles and Guidelines, and authorized criteria were used to develop a benefit-cost ratio.

2.2 Depletion of Odessa Aquifer

The Columbia Basin Development League estimates that about 170,000 acres are irrigated by groundwater in the Odessa Subarea;⁴ not all of these acres are within the Project boundary. The aquifer has declined to such an extent that some groundwater irrigators in the Odessa Subarea have had to drill new wells to a depth of 2100-2400 feet, costing up to \$200 per foot.⁵ Pumping water this deep has resulted in expensive power costs and water quality concerns such as high water temperatures and sodium content. Those irrigating with wells of lesser depth live with the possibility that future well production that may not be sufficient to irrigate. When this occurs an

⁴ Columbia Basin Development League. 2005. “Reclaiming the Odessa Aquifer.” Handout at October 26, 2005 Conference.

⁵ Columbia Basin Herald. 2005. Quoting local farmer, October 18, 2005.

irrigator may convert to dryland irrigation and grow lesser valued crops, abandon farming altogether, or drill much deeper for water at great expense. A study commissioned by the Washington State Potato Commission determined that if aquifer declines continue, fewer potatoes are produced and the potato processing economy will be impacted. The reduced potato production would result in an economic loss of \$630 million dollars annually and a loss of 3,600 jobs in the area.⁶

The declining aquifer is not only of concern to irrigators, but also municipalities in the Odessa Subarea which rely on the aquifer for municipal and industrial water supply. The goal of this Study will be to try to identify actions to reduce use of the aquifer for irrigation, but other actions will also be needed to fully address the issues associated with the declining aquifer.

2.3 Columbia River Withdrawals

Certificates, permits, and withdrawals are in place to irrigate all the authorized acres of the CBP. Although Reclamation has a senior water right withdrawal to irrigate the remaining authorized acres, it will still need to complete National Environmental Policy Act (NEPA) compliance, consult under the Endangered Species Act (ESA), and address other issues before it can divert additional water from the Columbia River. Table 2-1 summarizes water rights, permits, and certificates that Reclamation holds for irrigation and hydropower generation purposes for the CBP.

2.4 Columbia River Task Force

Governor Gregoire formed the Columbia River Task Force, comprised of State legislators, government agencies, community leaders, and interested organizations, to review future water resources policy options for the Columbia River. The Task Force's goal is to have policy and budget recommendations for the 2006 Legislature to consider.

The Columbia River Task Force evolved out of the Columbia River Initiative (CRI), developed under the previous governor (Gary Locke). The CRI was intended to promote a cooperative process for implementing activities to improve water management of the Columbia River and within the CBP. The CRI was also to develop an integrated Washington State program for managing Columbia River water resources to allow access to new water withdrawals while providing support for salmon recovery. The State of Washington, Reclamation, Q-CBID, SCBID, and ECBID signed a Memorandum of Understanding (MOU) in December 2004.

As proposed by the Locke Administration, the CRI included a policy bill; a capital budget request to acquire water rights, reshape flows, improve conservation practices, and develop new water storage capacity; and a bill to establish the water management policies for the main stem Columbia River. Activities leading up to draft legislation, posted on Ecology's Columbia Water Partnership website in January 2006, included a National Academy of Science review of

⁶ Washington State University. 2005. *The Economic Impact of Possible Irrigation-Water Shortage in Odessa Sub-basin: Potato Production and Processing*. June 2005. Prepared for the Washington State Potato Commission.

Table 2-1. Columbia Basin Project Water Rights, Permits and Withdrawals.

Certificate/Permit/ Application	Priority Date	Quantity	Purpose
Irrigation			
S3-01622C	5/16/1938	13,450 cfs 2,910,000 ac-ft/yr	Irrigation of 590,000 acres, hydroelectric, recreation, municipal, industrial
C-9252	12/24/1941	40 cfs	Irrigation of 1,319 acres, Block 2
S300019C	4/22/1943	212 cfs 70,000 ac-ft/yr ¹	Partial irrigation of 160,000 acres
C-10703	10/27/1958	80 cfs 23,121 ac-ft/yr	Irrigation of 3,303 acres, Block 3
R3-00013P	4/22/1943	200,000 ac-ft ² plus storage of project waste, seepage & return flow	Supplemental supply; irrigation of 234,000 acres
S3-25062C	10/27/1958	8.5 cfs 23,121 ac-ft/yr	Irrigation of 350 acres, Block 3
S3-28586P	5/16/1938	1,140 cfs 214,000 ac-ft/yr	Irrigation, hydroelectric, recreation, municipal, industrial
CBP Withdrawal	5/16/1938	10,410 cfs	Reserved for remainder of CBP
Withdrawal	6/16/1975	120 cfs	Block 1
Hydropower			
C-11543	5/16/1938	75,000 cfs continuously	Hydropower left and right bank of Grand Coulee Dam
C-11793	5/16/1938	6,400,000 ac-ft	Live storage, FDR irrigation – hydropower
C-11794	8/12/70	3,162,000 ac-ft	Dead storage FDR
S3-26257C	5/9/75	22,000 cfs continuously	Hydropower - 3 rd power plant- increased capacity
S3-26258C	10/16/69	184,000 cfs continuously	Hydropower - 3 rd power plant - 6 units
S3-27615C	10/16/69	7,400 cfs Continuously	Hydropower - 4 pump turbine units
S3-01606C	10/16/69	21,700 cfs continuously	Hydropower - increased capacity left and right bank - Grand Coulee (18,000 cfs), two pump turbines (3,700 cfs)
S3-01622C (Old Permit #15994)	5/16/38	13,450 cfs continuously March through October	Low head power generation
R3-00013P	4/22/43	200,000 ac-ft	Low head power generation

cfs = cubic feet per second; ac-ft/yr = acre-feet per year

¹ From Lind Coulee

² Natural flows from Rocky Ford, Upper Crab Creek, tributaries to Moses Lake, and Potholes Reservoir.

existing information relating to fish survival and hydrology in the Columbia River and a study of regional economics in the Columbia River basin as it relates to water use.

Many activities identified in the December 2004 MOU are currently being pursued. Sections 14 through 16 of the MOU describe three activities that are specific to the Odessa Subarea. The Study outlined in this POS addresses the commitment made in section 15 of the MOU, which states in part that “The parties will cooperate to explore opportunities for delivery of water to additional existing agricultural lands within the Odessa Subarea.”

Section 14 of the MOU focuses on delivering an additional 30,000 acre-feet from Lake Roosevelt to the Odessa Subarea. Reclamation has applied for a permit to obtain 30,000 acre-feet of Columbia River water to replace groundwater pumping in the Odessa Subarea. This effort involves collaboration with the ECBID which will deliver the additional water to irrigators within its district boundaries.

Section 16 describes an appraisal study that the State would conduct to investigate the feasibility of delivering Columbia River water to the Odessa Subarea for aquifer storage and recovery.

2.5 Listed Endangered or Threatened Species

Potential impacts to Columbia River fisheries from any change in operations at Grand Coulee Dam or additional diversions of Columbia River water will be a major environmental issue to address. Thirteen anadromous fish evolutionarily significant units listed under the ESA are potentially affected by actions that may be proposed by the Study.

The NOAA Fisheries issued a biological opinion (BiOp) in November 2004, addressing the effects to ESA-listed salmon and steelhead from operation of the Federal Columbia River Power System which includes the CBP and 18 other Reclamation projects. The Court has determined that the November 2004 BiOp is legally flawed and the status of the ESA consultation is uncertain. The outcome of this consultation and associated lawsuits has bearing on the status of any actions related to water use in the Columbia River.

Species listed under the ESA and administered by the Fish and Wildlife Service (FWS) that will also be considered in this Study may include the bald eagle and pygmy rabbit and two plants – Ute ladies’-tresses and Spalding’s silene.

2.6 Drainage Issues

Drainage is an issue and consideration throughout the CBP which has resulted in the construction of 3,500 miles of drains and wasteways for currently irrigated acreage. Some of the waterways in the Study area have probably experienced some additional flows due to irrigation seepage and return flows. According to Ecology, many creeks, draws, and springs have dried up because of the extensive groundwater pumping in the area. Depending on soil characteristics, drainage problems are expected to develop in the Odessa Subarea as surface water replaces ground water

and aquifer water levels rise. Consequently, the Study will need to consider the potential for drainage problems to develop.

2.7 Reclamation Reform Act

Farms receiving Project water would come under the requirements of the Reclamation Reform Act of 1982, which regulates the farm size. This requirement was cited as an issue by potential Project beneficiaries in previous investigations and will likely be of concern in the current Study.

2.8 Study and Construction Funding

Reclamation sought a non-Federal cost-share to conduct this Study and for any future construction. In September 2005, Governor Gregoire announced that the State will be a cost-share partner with Reclamation and has approved \$600,000 for fiscal year 2006. The State's cost-share commitment was solidified in an Intergovernmental Agreement between Ecology and Reclamation in December 2005. The Columbia River Task Force has identified the Odessa Subarea as the number one priority to address in the Columbia River Basin. Reclamation will work with Ecology as the lead State agency. In-kind credit for cost-share purposes may be allowed for products/services performed by the irrigation districts and others that are related to and beneficial to the Study.

2.9 Indian Trust Assets

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian Tribes or individuals by treaties, statutes, and executive orders. Indian trust assets (ITAs) can be found both on-reservation and off-reservation. On-reservation assets include protection of land, minerals, and water rights. Off-reservation assets include rights reserved by treaty or executive order to fish in traditional places.

Tribes with interests in the study area, including interests in potential downstream impacts from development in the study area, include the Confederated Tribes of the Colville Reservation, the Spokane Tribe of Indians, the Yakama Nation, the Coeur D'Alene Tribe, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation. These Tribes will be contacted on a government-to-government basis to gain their perspective on the existence of and potential impacts to ITAs. If negative impacts to ITAs cannot be avoided, the Tribes will be consulted on appropriate mitigation measures.

3.0 STUDY TEAM

The Study team will consist of several technical teams, support teams, and a management team. The roles and responsibilities of study teams are described here.

3.1 Management Team

The Management Team is responsible for overall coordination of all Study activities, schedules, and funding as well as serving as the communications point-of-contact for the Study.

3.2 Technical Teams

The Odessa Subarea Special Study requires the expertise of numerous disciplines to conduct the many technical studies required to adequately develop and evaluate alternatives and meet Reclamation's procedural and regulatory requirements. Technical teams assembled for this Study are summarized below.

Engineering Team - The Engineering Team will develop and evaluate alternatives, ranging from initial development at the conceptual level to development of detailed engineering design of a preferred alternative at a feasibility-level.

Water Supply and River Operations Team - This team will provide technical assistance regarding surface and groundwater supply issues and Project operations. This will include analyses and modeling of the Columbia River basin hydrology and CBP operations to aid in the development of alternatives and assist in effects determinations. The team will also develop a groundwater model to assist in developing and evaluating alternatives.

Geologic Team - This team will compile and report existing geologic information relevant to the Study, including geologic, seismic, and geotechnical design data.

Economics Team - This team will be responsible for conducting studies and analyses to determine whether an alternative is economically justified and financially feasible. This encompasses applying the Principles and Guidelines, including National Economic Development (NED) and Regional Economic Development (RED) studies, benefit-cost analyses, ability to pay studies, and cost allocations.

Soils and Drainage Team - The Soils and Drainage Team will be responsible for review and updates to the 1970s land classification inventories, as necessary, and will also address drainage issues.

Environmental Compliance Team - This team will be responsible for coordinating and conducting activities associated with the NEPA, ESA consultation, Fish and Wildlife Coordination Act (FWCA) coordination, and other environmental regulatory requirements.

3.3 Support Teams

Support Teams will assist the activities of the Management and Technical Teams through technical writing and report production, graphic and map production, database management, and research.

Public Communications Team - Given the broad spectrum of issues in the Columbia River basin, Reclamation will need to proactively communicate and collaborate with many external parties to successfully complete this Study. The Public Communications Team will be responsible for developing and implementing a public communications process that provides opportunities for all interest groups to participate in the Study in a collaborative manner.

Report Production Team - Numerous technical reports and documents will be produced during this Study. Technical staff will largely prepare or write many of these, but editing, formatting, and production coordination assistance will be provided by the Report Production Team. Technical writers will take the lead in preparing planning reports and EISs.

Geographic Information System (GIS) Team - The GIS Team will help with data collection and management. Databases developed will be used for production of maps and other graphics and technical analysis during the Study.

Project Authority and Contracts Research - This team will be responsible for providing information pertaining to Project authorities, repayment contracts, or water rights issues.

4.0 STUDY APPROACH

Study Management is the lead responsibility of the Upper Columbia Area Office in the Pacific Northwest Region of Reclamation. The Study will be conducted in a manner that satisfies the requirements of the NEPA, ESA, Principles and Guidelines, and other applicable environmental and regulatory compliance requirements necessary to seek Federal appropriations. The Study will provide information sufficient to allow decision makers to select a preferred alternative that meets the following criteria:

- Is technically viable
- Protects Indian Trust Assets
- Complies with NEPA, ESA, and other environmental regulations
- Is socially and environmentally acceptable
- Is economically justified (the benefits exceed the costs)
- Is financially acceptable (beneficiaries are willing to repay reimbursable construction and annual operation and maintenance costs)
- Is acceptable to the public

Reclamation will publish several technical reports and other documents describing the decision-making process. The agency will eventually prepare a joint EIS and feasibility-level planning report that will describe the alternatives considered, the analysis of these alternatives, and selection of an agency preferred alternative. The planning report documents the economic studies that will be conducted to evaluate the financial and economic feasibility of alternatives. Consultation under the ESA may require preparation of a biological assessment.

4.1 Study Phases

For management purposes, the Study is organized into four phases. Activities in some phases will overlap with other phases. A description of each phase and associated activities follows. The Study will require an interdisciplinary team of experts working at times independently and other times coordinating with other disciplines to accomplish the objectives and complete tasks identified for each phase. Activities for each phase are organized and described by technical team.

4.1.1 Phase 1: Organize and Develop Plan of Study

Objective: Reclamation will develop a study approach. A Plan of Study (POS) will be prepared that identifies the study problem and issues, study requirements, tasks, schedule, and funding needs.

Duration: FY 2005 through early FY 2006.

Products: Plan of Study

Activities: The following activities are largely conducted by the Management Team with assistance where relevant by technical experts.

Research Project background and authorities to determine regulatory requirements and process steps needed to study and later implement selected solutions.

Initiate scoping of study issues and considerations to gain an understanding of the complexity of the issues, help develop the study definition, and identify government agencies, organizations, and other interested parties that will need to be involved in the Study.

Develop a study purpose and scope.

Begin literature review and identify previous investigations with information relevant and useful to this Study.

Review 1970s land classification of potentially developable project lands to determine if additional inventory is necessary. *(Field review occurred in August 2005. About 15 land classification sheets were reviewed in the field with additional boring taken to determine if the existing classification is correct. Soil textures, depths, slopes, and impervious layers were compared to information on the land classification sheets. The 1970s study was determined to be more than adequate for this Study.)*

Identify regulatory requirements that will need to be met.

Develop study approach and time lines.

Determine study expertise required and initiate contacts with potential study team members.

Estimate funding needs and opportunities to cost-share.

Begin development of a public involvement strategy to meet mandated regulatory requirements and a process to collaborate with partners and work through issues with public agencies, Tribes, non-governmental organizations, and the general public (see table 4-1).

Begin negotiating cost-share agreements and defining roles and responsibilities among partners to conduct a collaborative study.

4.1.2 Phase 2: Pre-Plan Formulation

Objective: During this phase, Reclamation and partners will develop baseline technical information. The Odessa Subarea aquifer will be characterized, with high priority areas identified. Conceptual engineering plans for transporting CBP water will be identified that

Table 4-1. Interested Agencies, Tribes, and Non-governmental Organizations

Federal Agencies

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- National Park Service
- Bonneville Power Administration
- U.S. Army Corps of Engineers

State Agencies

- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Department of Agriculture
- Washington Department of Natural Resources
- Washington State Parks
- Washington Governor's Staff

Local Government/Agencies

- Washington Congressional Delegation
- State Legislature
- Grant, Adams, Lincoln, and Franklin Counties
- Grant, Chelan, and Douglas PUDs
- Cities and Towns in study area

Indian Tribes

- Confederated Tribes of the Colville Reservation
- Yakama Nation
- Spokane Tribe of Indians
- Coeur D'Alene Tribe
- Nez Perce Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of the Warm Springs Reservation

Irrigation Districts

- East Columbia Basin Irrigation District
- Quincy-Columbia Basin Irrigation District
- South Columbia Basin Irrigation District

Non-governmental Organizations

- Columbia Basin Development League
- Washington State Potato Commission
- Washington Association of Wheat Growers
- Northwest Food Processors
- Environmental Organizations (Washington Environmental Council, Center for Environmental Law and Policy, American Rivers, local chapters of Trout Unlimited, Audubon Society)
- Sportsman Organizations

Others will be identified as the communications plan is developed and the Study progresses.

are consistent with the study scope as defined in section 1.3 This phase will predominately focus on the technical merits of various concepts.

Reclamation will use a process called the Project Alternative Solutions Study (PASS) to efficiently generate and evaluate engineering concepts. The PASS process involves two teams -- an Objectives Team and the Technical Team. The Objectives Team is comprised of individuals representing stakeholder interests in the study area and has the role of developing criteria, objectives, and factors of acceptance for the alternatives that will be considered. The PASS Technical Team develops and evaluates engineering concepts based on the guidance provided by the Objectives Team. The PASS Technical Team will identify those concepts that merit further investigation by Reclamation. Concepts that Reclamation could reasonably complete to a feasibility-level of detail within a 3-year timeframe will be examined in Phase 3. Concepts requiring more extensive engineering, environmental, and technical studies in excess of 3 years are outside the scope of this Study.

Duration: This phase is scheduled to take place during FY 2006 and FY 2007.

Products:

- PASS Report
- Appraisal-level Report
- Various Technical Reports
 - Geological Report
 - Columbia River Hydrologic Conditions and Water Availability report
 - Odessa Aquifer Characterization
- Draft Economic Reports
 - Irrigation Benefits Analysis
 - Draft Irrigation Repayment
- Planning Aid Memorandum (prepared by US Fish and Wildlife Service)
- Class I Cultural Resource Survey

Activities: Activities are organized by technical teams. Generic activities include compilation of baseline information for the various resource areas, focusing on existing information, updating if funding and time allows, or identifying data gaps to address in later phases. This will include reviewing work completed for previous East High Investigations and the development of the second half of the CBP in the 1980s and early 1990s.

Management Team

The Management Team is responsible for coordinating all activities occurring during this phase.

Initiate agency/partner contacts to identify available information and issues.

Continue negotiating cost-share agreements and defining roles and responsibilities among partners to conduct a collaborative study.

Function as the communications point-of-contact for the Study.

Clarify study area boundaries and potentially developable lands.

Coordinate the process used to evaluate engineering concepts.

Engineering Team

Conduct literature review of previous investigations to identify potential engineering concepts.

Inventory existing infrastructure and capacities. Determine the capacities and constraints associated with current Project infrastructure, particularly the East Low Canal. This was considered in the work conducted in the 1980s, but should be revisited and updated if needed to consider other planning activities occurring concurrent to this Study.

Develop engineering concepts using information derived from previous Reclamation investigations, incorporating concepts developed in assessment studies prepared by others, and seeking input from other entities through public meetings.

Conduct PASS process to identify engineering concepts that will be developed to appraisal-level designs. The PASS process involves two teams -- an Objectives Team and the Technical Team. The PASS Objectives Team will meet for one day to develop criteria, objectives, and factors of acceptance used to evaluate engineering concepts. The PASS Technical Team will meet for approximately 6-10 working days to generate, refine, and evaluate concepts using the criteria developed by the Objectives Team.

Develop appraisal-level engineering designs for engineering concepts selected in the PASS process. Prepare quantities and cost estimates for alternatives. Prepare operation, maintenance, and replacement costs. Document findings in an Appraisal-level Report.

Identify design data needs for appraisal-level alternatives if carried forward to feasibility-level study.

Data requirements to conduct Phase 2 work:

- Water supply/needs assessment and proposed system operation
- Operational data for existing and future canals (flow, water supply elevations, demand system)
- Number, location, and capacities of pumping plants and pipe lengths from pumping plants, if applicable
- Off stream storage requirements, if applicable
- Interpretation of available seismic and geologic data
- General understanding of available construction materials (possible locations, haul distances, quantities)
- USGS Quad sheets for topography

Water Supply and River Operations Team

This team will be involved in three studies: 1) characterization of the Odessa Subarea Aquifer, 2) Columbia Basin Project operations modeling, and 3) Columbia River hydrologic conditions and water availability.

Odessa Subarea Aquifer Characterization

Collect information to characterize current aquifer conditions. Compile information identifying location, depth, and yield of wells. Map well failure and identify high priority groundwater areas. Identify lands irrigated by deep wells within authorized Project boundary.

Describe any surface water/ground water connectivity.

Develop a conjunctive surface water and ground water budget for the Study area.

Conduct a mass measurement of well water levels in the Study area.

Begin the development of a groundwater model to assess the effectiveness of any alternatives studied at addressing aquifer depletion issues and other effects.

Columbia Basin Project Operations Model

Run modeled scenarios using the Columbia Basin Irrigation Project RiverWare (CBIP-RW) model to assess the ability of the current Project infrastructure to deliver water. The CBIP-RW model will use a 10-year average of demands with historic inflows from 1950 to 2003 from Crab Creek basin as measured at USGS Irby gaging station.

Columbia River Hydrologic Conditions and Water Availability

This Study will describe the current hydrologic conditions of the Columbia River Basin including determining the water supply needs for agriculture, fisheries, M&I purposes; determining if there are current water supply shortages; and the availability of water for additional use from the Columbia River. This will entail updating the Columbia River water assessment completed by Reclamation in 2004 (a component of the Yakima River Basin Water Storage Feasibility Study). The Bonneville Power Administration (BPA) model used in this study was limited to hydrologic information for the 1929-1978 period of record. The BPA is currently updating this model to include data through 1999, anticipated to be completed by early 2006. Reclamation will review the updated model and revise the Study accordingly.

Coordinate with Ecology to map and incorporate water rights into the analysis.

Prepare report with associated tables, figures, and graphs displaying the effects of the additional pumping on Columbia River flows.

Geologic Team

Conduct a literature review and identify other potential sources of geological information such as the Washington Department of Natural Resources, the USGS, and the Department of Energy.

Compile available geologic mapping and information into a GIS database.

Compile and report existing geologic information relevant to the Study and identify data gaps. This compilation would include both existing Reclamation reports and unpublished information from others, where available.

Review existing topographic base maps of the study area and evaluate the need to obtain new or additional coverage for use in developing both appraisal-level and feasibility-level engineering technical designs.

Identify geologic, seismic, and geotechnical design data needs and prepare cost estimates for alternatives, if carried forward to feasibility-level study.

Perform a screening-level inventory of existing commercially available borrow materials and potential undeveloped borrow sources within the Odessa Subarea, including impervious material, sand filters, gravel drains, concrete aggregate, rockfill, and riprap.

Economics Team

Economic reports during this phase will primarily be based on past studies, existing data, or newly required supplemental information. Economic analyses will involve a range of preliminary efforts to estimate costs and benefits or other physical measures of impact for initial benefit-cost, cost effectiveness, or other types of alternative screening approaches.

Local partners have prepared and are continuing to conduct economic assessments of impacts from aquifer decline. As appropriate, the Economics Team will incorporate information from these studies and provide input into the scope of these studies to ensure that information can be incorporated into Reclamation's Study.

Estimate Irrigation Benefits (Farm Budget Model).

- a) Collect data on local farm production costs, prices received, land use, cropping patterns, and yields.
- b) Input data and run model with current data from above.
- c) Prepare written report of irrigation benefits.

Determine Irrigation Payment Capacity (Farm Budget Model).

- a) Collect additional data or adjust benefit data and run farm budget model to determine farm/district payment capacity.
- b) Input data and run model with current data from above.
- c) Prepare written report of irrigation payment capacity.

Estimate benefits for M&I, recreation, fish & wildlife, and flood control.

Estimate changes in hydropower benefits and changes in anadromous fish benefits.

Soils and Drainage Team

Coordinate input of land classification information into GIS.

Collect baseline soils information to assist in analysis of drainage considerations for Project development. Identify data gaps and additional data collection that might be required later in the Study, including identifying observation well networks.

Environmental Compliance Team

Begin internal scoping of potential environmental issues and considerations. Review previous investigations conducted by Reclamation in the study area to identify information generated during those investigations that can be used in this Study. Early scoping should include contacts with Tribes.

Begin informal consultation discussions with NOAA Fisheries and FWS to identify potential ESA consultation issues and considerations. This information will be useful for developing alternatives that may minimize adverse effects to ESA species.

Initiate Level I cultural resource survey to identify any significant cultural resource issues.

Initiate contacts with Washington Department of Fish and Wildlife to obtain baseline information and identify issues and concerns.

Water-related construction projects require compliance by Reclamation with the FWCA. Reclamation will initiate communications with the FWS to discuss the FWCA requirements and negotiate scope of work and milestones. FWS will develop an Issues and Concerns memorandum. It is anticipated that the FWS will have concerns about any activities within shrub-steppe communities and ground water/surface water interactions. Reclamation will be expected to provide funds to FWS for its involvement.

Public Involvement/Participation Team

Develop and implement public outreach plan and strategy. The plan will address how public participation requirements outlined in relevant regulations will be met and a strategy for communicating and collaborating with stakeholders and other interested groups throughout the process. This will be a living, evolving plan to accommodate the changing nature of the Study and the desired level of participation by the public and Reclamation.

Begin public involvement activities. Meet with interested agencies, Tribes, and public to educate about the Study and scope out issues.

GIS Team

GIS analysts will develop a GIS database that will be used for map production and conducting various analyses. This will entail identifying and acquiring existing GIS databases available within and outside of Reclamation and working with technical team members to develop or compile GIS data specific to this Study.

Report Production Team

Technical writing and editing assistance will be required to prepare the appraisal-level report and the supporting technical studies developed during this phase. Technical editors and writers will work with staff from various technical disciplines to ensure that all reports are presented in a consistent format and style.

4.1.3 Phase 3: Plan Formulation

Objective: Activities in this phase will focus on conducting detailed engineering studies of alternatives identified as the most viable in the appraisal-level studies conducted earlier.

Duration: About 18 months, FY 2007 and FY 2008

Products: Engineering design drawings and cost estimates
Feasibility-level report
Geological report

Activities: Activities in this phase are focused around engineering development of feasibility-level alternatives with other technical teams providing support to the Engineering Team. Concurrent to this phase, activities to initiate preparation of an EIS/ Feasibility-level planning report (Phase 4) will begin and are described under Phase 4 activities.

Management Team

The Management Team is responsible for coordinating all Study activities.

Function as the communications point-of-contact for the Study.

Engineering Team

Conduct detailed studies of viable “Future with Project” alternative plans; confirm/revise “Future without Project” alternative as appropriate.

Develop Project features consistent with water supply and needs and other design data.

Prepare feasibility-level designs of identified alternatives and develop feasibility-level field cost estimates.

Develop construction schedule for the preferred alternative.

Document findings in a feasibility-level report.

Water Supply and River Operations Team

Various activities to assist the engineering design of alternatives. This might include CBP operations and groundwater modeling.

Geologic Team

Provide information in support of feasibility-level engineering design and analysis.

Prepare geologic interpretation and recommendations throughout the Study.

In conjunction with the Engineering Team, identify design data needs for feasibility-level designs and prepare cost estimates for the investigations. This includes coordinating right of entry on private property and development of technical information needed to complete NEPA compliance for the field investigations.

Conduct field investigations, including soil and rock testing, as needed for feasibility-level engineering design and analysis. Depending on the size and scope of alternatives developed, an evaluation of local seismicity could be needed.

Perform a reconnaissance-level investigation of borrow sources within the Odessa Subarea, including an analysis of the types and quantities of materials available at each site along with estimated haul distances to Project features.

Document findings in a final geologic report for feasibility-level design. This report would include geologic descriptions for Study alternatives and documentation of the borrow reconnaissance.

Economics Team

Activities of the Economic Team are concurrent with Phase 4 described below.

Soils and Drainage Team

Conduct trace element analysis, if needed, on lands receiving Project water prior to construction.

Depending on data gaps identified in the previous phase, soil sampling and laboratory analysis may be required to determine hydraulic conductivity to provide information for drain spacing.

To forecast the extent of potential drainage problems and when drainage will be required, install a network of observation groundwater monitoring wells in critical locations.

Environmental Compliance Team

Activities of this team that are supportive of the development of alternative plans are concurrent with Phase 4 described below.

Public Communications Team

Activities concurrent with Phase 4.

Support Team

Activities concurrent with Phase 4.

4.1.4 Phase 4: Feasibility-level Analysis and Environmental Compliance

Objective: Phase 4 activities will occur simultaneously with some Phase 3 activities. Detailed analysis of the alternatives will occur to determine if they are financially feasible and economically justified as well as to determine effects to environmental and other parameters as required by NEPA, ESA, and other regulatory requirements. The feasibility-level study includes data and analysis at a level of detail that allows decision makers to understand the potential risks and benefits associated with alternatives and assist in selecting a preferred alternative.

The feasibility-level study will include preparation of a combined EIS, as required by NEPA, and feasibility-level planning report. This document will describe the alternatives considered, the analysis of these alternatives, and the selection of an agency preferred alternative. The planning report documents the planning and economic studies that will be conducted to evaluate the financial and economic feasibility of alternatives, including the Principles & Guidelines analysis. Consultation under the ESA may require preparation of a biological assessment. Table 4-2 lists laws and regulations that may need to be considered in this Study.

Duration: This phase will take at least 3-years to complete, from FY 2008 through FY 2010. The schedule could be extended depending on the complexity of the issues and funding limitations.

Products:

- Final EIS and Feasibility-level Planning Report and supporting documents
- Economic reports
 - Irrigation Benefits Analysis Report
 - Irrigation Repayment Report
 - Cost Allocation Report
 - Economic Impacts Report
- ESA Consultation Documents (may require biological assessment and biological opinion)
- Fish and Wildlife Coordination Act Report
- Other supporting technical reports as needed

Activities: Generic activities include:

Develop the “Future without Project,” or no action alternative, to use as baseline to evaluate the alternatives. All other alternatives are compared to the “Future without Project”

Table 4-2. Regulations and Laws That May Apply.

Environmental

- National Environmental Policy Act
- Endangered Species Act
- Bald Eagle and Golden Eagle Protection Act
- Fish and Wildlife Coordination Act
- Surface Mining Control and Reclamation Act of 1977
- Resource Conservation and Recovery Act of 1976
- Migratory Bird Treaty Act
- Comprehensive Environmental Response, Compensation and Liability Act
- Executive Order 12898 - Environmental Justice
- Magnuson-Stevens Fishery Conservation and Management Act
- Federal Noxious Weed Control Act
- Executive Order 13112 - Invasive Species

Cultural Resources

- Archaeological Resource Protection Act of 1979
- Archaeological and Historical Preservation Act of 1974
- National Historic Preservation Act of 1966 (Sec. 106)
- Antiquities Act of 1906
- Executive Order 11593 - Protection and Enhancement of the Cultural Environment
- American Indian Religious Freedom Act
- Executive Order 13007 - Indian Sacred Sites

Water and Related Land Resources

- Clean Water Act
- Safe Drinking Water Act of 1974
- Flood Disaster Protection Act of 1973
- Coastal Zone Management Act of 1972
- Executive Order 11988 - Floodplain Management
- Land and Water Conservation Fund Act of 1965
- Open Space Lands
- Urban Park and Recreation Recovery Act
- Farmland Protection Policy Act
- National Trails System Act
- Wild and Scenic Rivers Act
- Rivers and Harbors Act
- Executive Order 11990 - Protection of Wetlands, 1977
- Reclamation Reform Act

Air Quality

- Clean Air Act

Miscellaneous

- Intergovernmental Coordination Act of 1968
- Noise Control Act of 1972, as amended

condition. This is the condition expected to prevail if no Federal action is taken. The “Future without Project” condition may not be identical to existing conditions and most likely will not truly be no action, because future changes will likely occur regardless of whether any of the “Future with Project” alternatives are implemented.

Management Team

The Management Team is responsible for coordinating all activities occurring during this phase.

Functions as the communications point-of-contact for the Study.

Engineering Team

Provide technical assistance and review in the NEPA, economic and financial feasibility, and benefit-costs analyses, and the ESA consultation.

Water Supply and River Operations Team

Provide technical assistance in the NEPA analysis of existing and affected environments and ESA consultation. Specifically, provide information regarding flow regimes and hydrologic effects associated with proposed alternatives to determine environmental affects.

Geologic Team

Provide technical assistance in the NEPA analysis of existing and affected environments, particularly for discussions pertaining to geology and soils.

Economics Team

Collaborate with Water Supply, Environmental and Engineering Teams to obtain information needed for the economic analyses, such as water supply effects on anadromous fish, agriculture, M&I, and power, and project construction and O&M costs. Project alternative costs will be estimated through consultation and interaction with cost estimating engineers to determine the following costs:

- Total Project Costs for each Alternative
- Single Purpose Alternative Costs
- Multi-purpose Costs without each purpose
- Interest During Construction Costs
- Present Value of Costs (based on construction schedule and annual O&M estimates from engineers)

Identification of the affected economic resources, including a brief description and discussion of impacted areas will be provided and include preliminary estimates of benefits and/or costs.

Project purposes and their potential obligations as a result of Project implementation will also be identified. Specific areas addressed would include:

- Agricultural benefits
- M&I benefits

- Recreation benefits
- Fisheries benefits (use and non-use)
- Wildlife benefits (upland and waterfowl - consumptive and non-consumptive)
- Flood control benefits
- Hydropower benefits

These analyses will be documented in a technical report.

Economic Feasibility Analyses - Economic feasibility will entail a National Economic Development (NED) analysis using the Principle and Guidelines criteria for each alternative to compare the projected cost of an action with the benefits derived.

The effects of the alternatives are evaluated on a “with project” versus “without project” basis. Analyses will be conducted using the four accounts described in the Principle and Guidelines guidelines. The Principles and Guidelines require selection of the plan with the greatest net economic benefits consistent with protecting the Nation’s environment (the NED plan), unless the Secretary grants an exception to this rule. The evaluation of the alternatives involves four accounts:

- 1) National Economic Development (NED) account displays changes in the economic value of the national output of goods and services and is measured using net willingness-to-pay (consumer and producer surplus) for goods and services. For decision making purposes only the NED account is required. The NED account relies on established and generally accepted methods and definitions for the measurement of costs and benefits.
- 2) Environmental Quality (EQ) account displays non-monetary effects on significant natural and cultural resources.
- 3) Regional Economic Development (RED) account registers changes in the distribution of regional economic activity that result from each alternative and is measured by regional income and employment.
- 4) Other Social Effects (OSE) account registers alternative effects from perspectives that are relevant to the planning process, but are not reflected in the other three accounts (e.g., community impacts, life, health/safety).

A benefit/cost ratio by alternative would be presented using the annualized present value of project costs and annualized present value of project benefits.

Update M&I, irrigation, recreation, fish and wildlife, and flood control benefits that were determined in Phase 2.

Determine Regional Economic Impacts.

- Determine regional impact area.
- Determine direct impacts (agricultural model).
- Determine indirect impacts (IMPLAN Model).
- Prepare written report of regional impacts.

Financial Feasibility Analysis - Financial feasibility is the determination of the reimbursable and non-reimbursable Project costs to the Project beneficiaries and their ability to repay their assigned costs. The appropriate methodology for allocation of Project costs will be based upon Reclamation's Economic Guidelines or specific direction contained in the Project authorization. Costs and benefits determined earlier in the NED analysis will be the basis for cost allocation purposes. Reimbursable and non-reimbursable costs will be identified for allocation purposes. Ability to pay analyses may be required for agricultural water supply beneficiaries. The goal will be to use a SCRB (Separable Cost Remaining Benefits) allocation process.

Update Irrigation Payment Capacity that was determined in Phase 2.

Determine Irrigation Ability-to-Pay.

- Determine O&M allocated to irrigation for each alternative.
- Determine Federal and non-Federal outstanding irrigation-related obligations.
- Meetings with stakeholders/irrigation districts to verify payment capacity assumptions and existing obligations.
- Compare Irrigation Payment Capacity to irrigation O&M and outstanding obligations for all alternatives.
- Prepare Irrigation Ability-to-Pay write-up

These analyses would be developed into a technical report.

NEPA Analysis - Concurrent with the Principles and Guidelines analysis, the Economics Team would conduct an analysis to meet the NEPA requirements. Specific tasks would include the following:

A socioeconomic description of the study area counties, including current population, employment, and income estimates as well as the identification of future trends or projected changes.

An RED impact analysis will be conducted for each alternative, estimating changes in regional economic activity.

- Components: Changes in output of production and services due to implementation of alternatives, construction, and operation, maintenance and repair (OM&R) expenditures, Project related changes of expenditures for agriculture and M&I water supply, recreation, and fisheries.
- Measurement: In terms of changes in regional income and employment due to within region expenditures resulting from each alternative plan. Includes direct effects as well as indirect and induced effects (multiplier effect).

Soils and Drainage Team

Lands that are selected for irrigation with Project water that have not been classified will need to be classified and approved before construction can begin.

Provide technical assistance in the NEPA analysis of existing and affected environments including soil erosion, land use (cropping pattern), and trace element analysis.

Environmental Compliance Team

The Environmental Compliance Team takes the lead in conducting and coordinating activities necessary to meet various environmental compliance requirements, including requirements under the NEPA and the ESA, among others. Assistance from other technical teams will be required to complete analysis and documentation.

The NEPA analysis will include a description of the existing environment and analysis of affected environment for several disciplines. Subject areas covered in previous investigations include:

Earth	Socioeconomics
Climate and Air Quality	Aesthetics
Surface and Ground Water	Recreation
Energy	Historical and Cultural Resources
Vegetation	Transportation
Fish and Wildlife	Public Resources
Environmental Health	Utilities
Noise	Environmental Justice
Land use	Indian Trust Assets

The NEPA analysis will include an evaluation of short-term affects associated with any construction activity as well as long-term affects associated with future operations. The scope of analysis and magnitude of effects are dependent on the extent of new facility construction proposed and sometimes OM&R.

ESA Consultation - Continue Section 7 ESA informal consultation activities through development of the EIS. Upon selection of a preferred alternative/plan and if adverse effects to ESA-species or adverse modification to critical habitat are determined, submit documentation to Services to initiate formal consultation.

Cultural/Historical Resources and Analysis - The EIS will need a set of baseline cultural resource and ethnographic information to develop the necessary analysis, alternatives, and consequences. Usually, completion of a Class I and Class III survey, and Traditional Cultural Properties (TCP) inventory, together with the correspondence evidencing consultation with the State Historic Preservation Officer and Tribes, and a plan describing probable evaluation and mitigation strategies is sufficient for completing the EIS.

The EIS must also address American Indian Sacred Sites, which is sometimes confused with products generated from archaeological and historical surveys. Although there occasionally is some overlap with information obtained through an inventory of TCPs, Sacred Sites are technically the narrow application of Executive Order (EO) 13007 (Accommodation of Sacred Sites; May 24, 1996); the EO addresses Sacred Sites on Federal lands. A separate

consultation with Tribes must focus on whether or not a project will affect access to sites important in American Indian religious practices. In other words, completion of a Class I, Class III, and TCP survey does not presume to meet the needs to address EO 13007.

Specific tasks and products during this phase include:

- Conduct TCP inventory
- Conduct Sacred Sites consultation
- Initiate consultation with Tribes
- Initiate Cultural Resources Class III surveys
- Identify historic properties needing evaluations
- Assist in EIS preparation
- Develop mitigation needs and schedule
- Conduct Section 106 consultation

Public Involvement/Participation Team

Implement public involvement activities associated with NEPA and other regulatory requirements. Activities will include scoping meetings with the public to meet NEPA requirements when initiating preparation of an EIS.

Continue meetings with stakeholders and agencies to coordinate development of information and analysis.

Obtain public input on issues, concerns, and possible impacts of viable alternative plan.

Report Production Team

The technical editor and writers will assist with all tasks associated with developing the draft and final EIS and any other reports and or documents (i.e., technical appendices) relevant to the EIS. The technical editor and writers work closely with the technical staff from various disciplines to ensure that their analyses are presented in a technically accurate format that can be read and understood by a diverse audience.

GIS Team

The GIS Team will prepare maps and conduct analyses to support the technical teams.

4.2 Actions to Implement a Preferred Alternative

Actions required to implement the preferred alternative are not addressed in this POS, but would include various reviews within Reclamation, the Department of the Interior, and Office of Management and Budget in Washington D.C. before information is submitted to Congress to seek appropriations. Once Congress receives the request for an appropriation, there is usually a three-year lag time in the budget process before Reclamation would have the necessary funds. After receiving appropriations, Reclamation would develop detailed engineering specifications and then initiate the contract process to request proposals and identify a contractor to construct or implement the preferred alternative. Reclamation would also need to negotiate contracts for repayment of any reimbursable costs with irrigation districts and other beneficiaries.

4.3 Study Schedule

The Study schedule is estimated and based on the standard timeframes required to complete key documents or fulfill regulatory requirements. Because many of these are outside Reclamation’s control, some timeframes may take longer and the schedule will need to be extended as the Study progresses.

October 1, 2005	Begin collection of baseline data and scoping technical studies
February 2006	Public Open House
February 2006	PASS Objectives Team convenes
July 2006	PASS Technical Team convenes
September 2006	PASS Study completed
Spring 2007	Appraisal-level engineering report completed
Spring 2007-Fall 2008	Develop detailed engineering designs
Fall 2007 – Summer 2010	Feasibility-level analysis and environmental compliance
Summer 2010	Joint EIS/ Feasibility-level planning report completed

4.4 Funding

Reclamation requires, at a minimum, a 50/50 cost-share to conduct the Study. Congress has included appropriations in Reclamation’s Washington Investigations budget for FY 2005 and 2006 to conduct the Odessa Subarea Special Study. The State has begun its cost-share commitment by appropriating funds for FY 2006. A consistent level of funding is critical in future years to keep the Study on track and on schedule. Estimated budget by phase is described below. These are preliminary estimates and will change as issues are scoped out in more detail and specific alternatives are identified during the Study process.

<u>Phase</u>	<u>Time Line</u>	<u>Costs</u>
Phase 1 – Organize Study	FY 2005	\$ 100,000
Phase 2 – Pre-Plan Formulation	FY 2006 – FY 2007	1,568,000
Phase 3 – Plan Formulation	FY 2007 – FY 2008	1,200,000
Phase 4 – Feasibility-level Analysis/ Environmental Compliance	FY 2008 – FY 2010	<u>3,000,000</u>
	TOTAL	\$ 5,868,000

ATTACHMENT A

Columbia Basin Project Development - Time Line of Key Events and Investigations

<u>DATE</u>	<u>EVENT</u>
June 16, 1933	<u>National Industrial Recovery Act</u> Funds allocated for Grand Coulee Dam
August 30, 1935	<u>Rivers and Harbor Act</u> Grand Coulee Dam authorized
1939	<u>Reclamation Act of 1939</u> - Returned power to Secretary to approve a finding of feasibility and thereby authorize construction upon submittal of report to President and Congress.
1939	<u>Columbia Basin Joint Investigations</u> Reclamation in cooperation with and assistance of others undertook a program of studies relating to Development and Settlement of Project.
1937-1941	Survey made on a gross classification area of 1,909,906 acres.
March 10, 1943	<u>The Columbia Basin Project Act</u> Reauthorized the Project for 1,029,000 acres and renamed the Project the Columbia Basin Project. Subjected the CBP to Reclamation Project Act of 1939 requirements.
July 1943	<u>Development of Irrigation Plan, Columbia Basin Project</u> Board of Engineers report describing irrigation of 1,029,000 acres.
May 10, 1945	<u>Joint Report on Allocation & Repayment of the Costs of the CBP - House Document No. 172</u> Reclamation files H. Doc. 172 with Congress meeting feasibility requirements under Section 9(a) of the 1939 Reclamation Act. Report addresses engineering feasibility and proper allocation of estimated construction costs. Will serve net 1,029,000 acres. CBP found financially feasible in accordance with test established in Sections 9(a) and 9(d) of the 1939 Act.
June 1946	<u>Development of Water and Other Resources Present and Potential of the Columbia River Basin, Washington, Oregon, Idaho, Montana, Wyoming, Nevada, and Utah</u> Comprehensive plan for development of the entire Columbia River Basin submitted by Commissioner to Secretary, includes CBP.

<u>DATE</u>	<u>EVENT</u>
1949	Repayment Contracts
August 11, 1952	Secretarial certification of land classification survey.
1952	First CBP water applied to lands from Grand Coulee Dam.
March 1953	<u>CBP Definite Plan Report</u> 1,029,000 acres will be served with development estimated to occur for period 1948 to 1971.
1959-1962	Another detailed land classification survey conducted in area east of and adjacent to, but higher than area covered by original survey.
July 11, 1961	<u>Solicitors Legal Opinion</u> concluding Section 9(a) feasibility requirements met in 1945 by submittal of H. Doc. 172.
1962	<u>Act of October 1, 1962, Repayment Contract Amendment</u> Congress approved terms and proposed Project development in Article 6 of Amendatory Repayment Contract for Q-CBID. Also approved authority to negotiate and execute amendatory repayment contracts with SCBID and ECBID.
October 2, 1962	<u>Amendatory Contract Q-CBID</u> Article 6(a) – total lands served in project 1,029,000; Q-CBID acres adjusted from 298,000 to 257,000 acres.
April 1968	<u>East High Investigations</u> Report transmitted from Reclamation Regional Director to Commissioner. Described as an addition to Project from that described in the Engineers Report; proposal to irrigate up to a total of 1,095,000 acres in the CBP, including 385,000 acres in East High area (the original plan called for serving 215,000 acres in this area).
December 18, 1968	<u>Amendatory, Supplemental and Replacement Repayments Contracts with Q-CBID and ECBID</u> Transfer of O&M to irrigation districts.
August 1975	<u>Construction of Second Bacon Siphon</u> Economic and financial analysis prepared.

<u>DATE</u>	<u>EVENT</u>
February 1976	<p><u>FEIS Columbia Basin Project - Volumes 1 and 2</u> Volume 1 provides an overview of the CBP begun in 1933. Describes the impacts of existing CBP development and anticipated effects of proposed CBP development for remaining 568,000 acres. Defines “lands in the project” as arable lands which have been tentatively identified for water service from Project works & which are required to be included in the Project in order to provide for its development (pg I-5 – Citing H. Doc. 172). Odessa Subarea described on page I-117. Deferred lands defined as in authorized Project with potential to receive Project water if system were built to capacity. Bypassed Lands defined as a potential irrigation water supply not included in original design capacity, because originally classified as non-irrigable because of limitation in technology at time. Volume 2 contains copies of numerous memorandums with Tribes, State, etc.</p>
August 20, 1976	<p><u>Memo from Commissioner to Secretary</u> Summarizes Master Water Service Contract provisions and intent.</p>
August 1976	<p><u>Contract between Reclamation and State of Washington</u> for second Bacon Siphon.</p>
August 27, 1976	<p><u>Master Water Service Contract</u> between Q-CBID and ECBID and State Supplemental to Repayment contracts. Describes two phased approach: 1st phase - Construction of Second Bacon Siphon and Tunnel</p>
September 16, 1977	<p>Commissioner adopted modified plan to provide service to ECBID and SCBID. Addressed construction of East High Canal, but it was not pursued because repayment contracts were not negotiated.</p>
1980	<p>Second Bacon Siphon and Tunnel constructed, built to supply water for full capacity of CBP.</p>
June 1981	<p><u>EA and FONSI for Block 26</u> Addressed 12,000 irrigable acres at west end of Wahluke Slope; the last area Reclamation agreed to develop under the Repayment Contracts.</p>
April 30, 1982	<p><u>EA – Limited Irrigation Development on CBP</u> Evaluated non-Federal irrigation development on the CBP. Preferred alternative involved 10,000 acres each in Q-CBID and ECBID and modification of West Canal.</p>

<u>DATE</u>	<u>EVENT</u>
July 1982	<u>EA and FONSI – Limited Irrigation Development</u> Addressed providing water service from Project facilities for up to 20,000 acres First Phase Continuation acres. Proposed action involved development of 10,000 acres in Q-CBID with modification to West Canal (Deferred and Bypassed lands), and 10,000 acres in ECBID without canal modification (eastern upland, east of developed portion of CBP). Would require Supplement to Master Water Service Contract govern sale of First Phase Continuation Water from irrigation districts to landowners.
October 8, 1982	<u>Supplement to Master Water Service Contract</u>
September 1984	<u>Briefing Information on Continued Development of the CBP</u> Provides CBP background and development history. Examined potential alternatives for continued development. Preferred plan involved full development with initial Phase I - 173,000 acres to be followed by remaining 366,000 acres.
September 1986	<u>Columbia Basin Marketing Study</u> , Prepared by CH2MHill Analysis involved 1) historic crop production in Columbia Basin, 2) identify crops suited to area, 3) screen crop lists for most economic viable, 4) develop market outlook, 5) evaluate share and demand, and 6) evaluate price impact.
1989	<u>DEIS for Second Half of Columbia Basin Project</u> Preferred Plan: Phase 1 - 173,00 acres of Deferred and Bypassed lands within first half of Project and East High/East Low Extension; Q-CBID 50,000 acres, SCBID 20,500 acres, ECBID 102,400 (40% groundwater) acres; Phase 2 - 366,000 acres in future
June 1989	<u>NED Analysis of Alternative Plans for Continued Development of CBP</u> , Prepared by Reclamation CBP is authorized project with no significant alterations. Reclamation not reformulating the project but rather evaluating alternatives for project completion. Because of magnitude and significance of issues involved, decided to evaluate alternatives using economic analyses prescribed by Principles and Guidelines and authorized criteria (3-percent interest rate). Construction cost estimates for two alternatives: Alternative 1 - full-phased development; Alternative 2 - East Low Canal to serve 87,000 acres

<u>DATE</u>	<u>EVENT</u>
July 1989	<u>RED of Alternative Plans for Continued Developments</u> , by CH2MHill Alternative 1 - Net benefit \$116 million annually; cost-benefit ratio 6.3:1 Basin, 3.1:1 State Alternative 2 - Net benefit \$21 million annually; cost-benefit ratio 8.4:1 Basin, 4.2:1 State
September 1989	<u>DEIS for Continued Development of CBP, Washington</u> Alternative 1 - Full phased development in two phases, enlarge Main and West Canals, enlarge and extend East Low Canal, construct Black Rock canal system and 2 pumping stations; \$2.6 billion to construct Alternative 2 - East Low Canal Development to serve 87,000 acres; 216,000 acre-feet water diverted, enlarge and extend East Low Canal, enlarge siphons along East Low Canal, modify and extend Lind Coulee and Scootenev wasteways, construct Providence Coulee wasteway, construct pumping plant, Project water to lands currently using groundwater, interruptible water service, and dryland farming, \$313.5 million to construct No Action – no further Federal CBP development
November 1989	<u>Public hearings for DEIS</u> Transcripts available for four hearings in Pasco, Moses Lake, Spokane, and Seattle, Washington.
October 24, 1991	<u>Memo from Acting Regional Director to Asst. Commissioner – Resources Management re: P.L. 89-72</u> Cites exception for requesting feasibility authority from Congress would be where Congress authorized a phased approach and cites CBP as an example.
September 1993	<u>Supplement to the DEIS for Continued Development of CBP</u> Prepared to examine new information re: fish resources, variations in reservoir water levels, and Anadromous Fish Plans and Specific Fish and Wildlife Plans. Preferred plan involves limited scale development of 87,000 acres (divert 216,000 acre-feet at Grand Coulee Dam) and Anadromous Fish Plan providing flows from Grand Coulee Dam for augmentation.
January 20, 1994	Memo from Columbia Basin Project Manager to Regional Director Keys recommending suspension of new water service contracting.
February 4, 1994	Memo from Regional Director Keys to Columbia Basin Project Manager supporting orderly suspension of new CBP water service contracting.

<u>DATE</u>	<u>EVENT</u>
February 4, 1994	Regional Director Keys concurs with recommendation of moratorium to Acting Environmental Officer Doug James.
November 2003	State lifts moratorium on new withdrawals from Columbia River.
November 7, 2003	Letter from Regional Director McDonald to irrigation districts lifting the self-imposed moratorium on new water service contracts for CBP.
December 17, 2004	Columbia River Initiative signed.
FY 2005	Reclamation FY05 appropriations bill includes a write-in for \$100,000 under the Washington Investigations Program “for appraisal of the Odessa Sub-aquifer.”