

FY 99 TECHNOLOGY TRANSFER CONFERENCE

ECONOMIC ANALYSIS WORKSHOP AFTER ACTION REPORT/CONFERENCE PROCEEDINGS

WORKSHOP: Economic Analysis Workshop, May 18-20, Portland, Oregon.

POINT OF CONTACT: Ron Conner, CECW-PD, (202) 761-0132

WORKSHOP OBJECTIVES:

1) Objective - Address new economic issues and discuss procedures and guidance related to the environmental restoration mission and the watershed approach to decision analysis. Specifically address issues related to trade-offs of environmental and monetary outputs and economic analysis in multi-objective studies.

participants information required to complete this objective. The objective was accomplished through multi-agency presentations on collaborative planning in the Snake River Study, joint HQUSACE – LAD presentation on Optimum Tradeoff Analysis, a case study on the Everglades Restoration and presentation by IWR researchers and field personnel on Managing the Upper Mississippi River and Evaluation of Non-structural Measures. Based on post-conference response, these presentations were extremely well received.

2) Objective - Provide an opportunity for staff in all Corps District and Divisions to meet and interact with top HQUSACE personnel to discuss issues, initiatives and challenges of the Corps evolving missions.

Accomplishment - HQUSACE senior leaders and staff provided several presentations at the conference, highlighted by Dr. Jim Johnson talk, *Views from the Chief*. Other presentations included *Washington Update* from Harry Kitch, Chief of the Formulation and Evaluation Branch in Planning Division, *New Planning Initiatives* from Bob Daniel, Chief of the Planning Initiatives Group in Planning Division, and *the Review Process* from Steve Cone, Chief of the Management Review Section of the Policy Compliance Review Office. Some participants noted that senior staff economists from HQUSACE were absent from the conference. This was due to unavoidable HQUSACE travel restrictions; but did not significantly reduce the quality of issue discussion.

3) Provide an opportunity to maintain face-to-face communication among all levels of the Corps to discuss analytical procedures and planning policies. This type of workshop facilitates discussion and idea sharing of state-of-the-art methodologies, databases, and computer capabilities useful for multi-objective studies.

Accomplishment – New computer software and methodologies were discussed at length throughout the conference. IWR staff provided an overview and workshop of IWR-PLAN, a software program that can be used in multi-objective studies. IWR and Maritime Strategies International staff presented the new vessel operating cost software, which allows for port-specific variation of vessel operating costs. Arlene Dietz, the Chief of the Navigation Data Center, provided detailed explanations of databases available for use in inland and deep draft navigation studies. Other presentation discussed the Flood Damage Data Collection and risk analysis research programs and new benefit methodologies for Inland Systems Studies.

WORKSHOP REPORT:

1. Attendees: 103 with a breakdown as follows:

- 64 District
- 10 Division
- 5 HQUSACE
- 11 Institute Of Water Resources / Navigation Data Center
- 3 Other Federal Agencies
- 2 Other Non-Federal Agencies
- 2 Academia
- 6 Private Organizations

2. Agenda: The agenda follows with a brief synopsis of the presentations. These synopses were prepared by conference participants.

**MAY 18
MORNING SESSION**

**SESSION ORGANIZER
RON CONNER, CECW-PD**

0830-0845	OPENING REMARKS	COLONEL ERIC T. MOGREN DEPUTY COMMANDER, NWD
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Colonel Eric T. Mogren, Deputy Commander, Northwest Division, graciously provided welcoming remarks for the Economic Analysis Conference.

0845-0900	ADMINISTRATIVE DETAILS	RON CONNER, CECW-PD
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Mr. Conner outlined various administrative details including conference format, expectations, and reporting requirements.

Mr. Kitch began his discussion by stating that he believed the Corps must do proper analyses and have objective consideration of projects. Even though it is possible to analyze forever, we are faced with constraints – time, money, and people. We must be able to effectively communicate both orally and in writing, be a team player, and do things correctly by planning ahead (Project Study Plans (PSPs)). Mr. Kitch then emphasized that we work for the taxpayers.

Mr. Kitch went on to discuss the responsibilities of the Formulation and Evaluation Branch at Headquarters (CECW-PD): disseminating guidance, revisiting the planning process, training, research and development, and assisting the field.

- Guidance –Mr. Kitch discussed the Guidance Improvement Program, March 1999 Plan of Action. Due to current guidance being fragmented as well as an evolving target audience - newer workforce, non-Federal sponsors, and project management – one notebook containing all relevant guidance will be developed. New Planning Guidance will be formatted in the following manner:

Section 1 – Planning Process – 6 Steps in Decision Making

Tier 1 – Broad Principles (How we do planning, main things we are able to or can do)

Tier 2 - Detailed Implementing Guidance (Make it more user friendly)

Tier 3 – Detailed Procedures and Methods (Identifies the tools but is not regulatory)

Section 2 – Management of Planning

Tier 1 – Planning Programs

Tier 2 – Study Process Management (How many copies of report to where, how to do a FRC, etc.)

- Planning Process - CECW-PD is revisiting the planning process and looking for ways to improve it. Even though the political process will play its role, the planning process should be theoretically sound.
- Training – CECW-PD has maintained its role in Prospect Training. They are currently looking for ways to improve providing current accurate training to the field; internet options are being explored.
- Research and Development – Input from the field regarding current and anticipated problems related to research and development was requested.
- Assistance to Field – Mr. Kitch stated that CECW-PD would continue to maintain its role in this regard.

Washington Update

Mr. Kitch began his Washington update by discussing the current status of the Water Resources Development Act of 1999. It has passed both the House and Senate and Conference is expected soon. Regarding budget highlights, Mr. Kitch stated that fiscal year (FY) 00 General Investigations, \$135 million, is significantly lower than FY 99. There is only one new start, ongoing studies and projects are constrained, and research and development and data collection are at FY 99 levels.

Mr. Kitch continued by highlighting various elements of the National Research Council (NRC) Report on Corps Planning. Several areas mentioned included the NRC's recommendations for the Corps to emphasize basinwide perspective, include monitoring and evaluation in projects, and varying procedures by project size. Further highlights included: the need for a national water policy group; raising the cap on Continuing Authority Projects; continuing research on global warming; requiring non-federal sponsor to identify needs prior to the initiation of the reconnaissance study; reviewing ability to pay; reducing delays between study phases; updating and improving analytical methods; and examining monetary benefits and costs for environmental restoration project. Finally, the NRC's report recommended not shortening the planning process any further and displaying the benefit-to-cost ratio in directed projects.

POC: Harry Kitch, CECW-PD, (202) 761-1969.

Mr. Kitch's PowerPoint presentation is available at ***

1030-1115

**NEW PLANNING
INITIATIVES**

**BOB DANIEL, CHIEF, CECW-
PIG**

Mr. Daniel is head of the Planning Initiatives Group, (PIG). The PIG was formed because the Corps needs to find new missions and work to survive and prosper. Mr. Daniel believes we must look at opportunities and not self-destruct. The Corps includes the field offices and they should try ways to expand the program.

The Civil Works program is presently project-based, which is an inefficient way of using funds. Section 22 of WRDA 74, Planning Assistance to States has not been used to build a program. We should definitely look at the opportunities to help the state by using Section 22 to create studies and projects. We want volunteers for studies using Sec 22 funds to build the program.

The Corps can use its water resources expertise to help other agencies in developing urban water resources. We can leverage Flood Plain management funds and Planning Assistance to States funds by building relationships with other agencies. We should study other agencies needs and see how we can help them. Successful initiatives should be inclusive, innovative, proactive and have immediate positive impacts.

POC: Bob Daniel, CECW-PIG, (202) 761-8568.

1115-1200

**THE ECONOMIST ROLE IN
THE CHANGING CORPS
ENVIRONMENT**

KEN COOPER, DDPM, CENWO

Economists have seen an evolving role within the Corps over the past few years. We were the first important non-engineer professionals in the Corps, and became invaluable. Then came the Environmentalists, and now the Project Managers. Historically, Corps economists have been the leading practitioners of benefit-cost analysis. Very few firms or agencies actually conduct these studies, and nobody does B/C analysis better than the Corps' economists. Although our role is evolving, we should also do more regional analysis to support our projects and to meet our project sponsors needs. Economists are THE logical choice to conduct resource allocation analyses, which includes financial, time, and human resource allocation studies. Environmental Restoration is another opportunity for economists, even though we are currently excluded most often from these studies. Economists understand trade-off analysis, so we can bring those skills to bear effectively, even though we might not monetize the benefits of environmental restoration projects.

In order to enhance career development for economists we must become invaluable again. There are more and more technical GS-13 positions being created, but we can, and should, also pursue managerial positions. Even though supervisory positions are less available today due to restructuring, there are opportunities to be team leaders, project managers, and other specialized leaders where economics skills are desirable. The key to advancement is to diversify your experience: functionally, geographically, and organizationally. Volunteer for special assignments outside your branch or section, division, or district. Develop your communications, leadership, and managerial skills, as well as your technical expertise in order to be competitive.

POC: Ken Cooper, CENWO-EX, (402) 221-3928

Mr. Cooper's PowerPoint presentation is available at ***

**CONCURRENT AFTERNOON SESSION
WATERSHED ANALYSIS SESSION (1)**

**SESSION ORGANIZER
DAN SULZER, CHIEF,
CESPL-PD-WE**

1300-1400

**OPTIMUM TRADEOFF
ANALYSIS – CASE STUDY,
WHITEWATER RIVER**

**RON CONNER, CECW-PD
MICHAEL HALLISY,
CESPL-PD-WE**

Mr. Conner presented the new concepts that define the basis for Federal involvement in environmental restoration and multipurpose studies. He noted these concepts are simple extensions of the P&G principle of maximizing net benefits, and are described in the new version of Chapter 5, ER 1105-2-100 available on Planning Division's home page. He introduced a new term, NER, which stands for National Ecosystem Restoration. Single purpose ecosystem restoration plans are developed and evaluated in terms of their net contributions to NER. The plan that maximizes net contributions to NER is designated

the NER plan, similar to the NED plan in a study with monetary benefits. The Optimum Trade Plan, OTP, is the plan that maximizes the sum of net contributions to NED and NER in a multipurpose study. Mr. Conner then explained the economic theory that provides the foundation for the maximizing net benefit principle.

Mr. Hallisy then described the application of the optimum tradeoff analysis in a Case Study. Whitewater River in California is located in the Palm Springs area in Southern California. The area is subject to alluvial fan flooding on both developing land and a Fringe Toad Lizard Preserve managed by the Nature Conservancy. The lizard, listed as an endangered species, requires sand replenishment for long term survival. The source of sand to the preserve is a wind corridor which would be developed in the without project condition. The optimum tradeoff analysis for the Whitewater Study evaluated various alternatives to set aside land for the wind corridor to maintain the sand flow to the Preserve. Mr. Hallisy's conclusion was that tradeoff analysis provided a framework for evaluating multi-objective projects; but, the answer may still come down to subjective judgement.

POC: Michael Hallisy, CESPL-PD-WE, (213) 452-3815

Mr. Conner's PowerPoint presentation is available at ***

Mr. Hallisy's PowerPoint Presentation is available at ***

1400-1500

**MANAGING THE UPPER
MISSISSIPPI RIVER SYSTEM
THE ECONOMIC ROLE**

**BRUCE CARLSON, CEMVP-
PM-E**

This session involved five studies along the Upper Mississippi that required multi-use management. The studies were coordinated efforts covering multiple states and utilizing team management at the Federal, State and Local level. The goals of the studies were to analyze ways to improve: fish & wildlife, flood damage reduction, navigation, pollution, recreation, and water supply.

The five studies were as follows:

- 1) Economics of Recreation - looked at both positive (12 million annual visits) effects of recreational boating. Economist's role included coordination, IMPLAN I/O analysis and disseminating results.
- 2) Forecast/Effects of Recreational Boating – determined the negative effects of recreational boating on the ecosystem. Econ roles included participation in EIS, possible strategic planning, link with physical effect team.
- 3) Pool Drawdown Pilot Study – purpose was to provide regeneration of aquatic plants, downside losses = potential channel and access problems. Economist's role: plan formulation and impacts analysis.
- 4) Public Survey – 2,500 phone surveys were made to assess how people value the varied purposes of the river. To determine the public preferences for future management. Roles of the economist: sociologist, disseminate results & relate to other reports.

- 5) EMP- Habitat Needs Assessment – formed a team of social scientists with the aid of other agencies, analysis included gap analysis, GIS database and determination of resource significance. Econ roles: convince team of economist’s significance, assist team, develop approach, package results.

The session also provided several web sites for further reference. These included:

www.mvp.usace.army.mil

www.umesc.usgs.gov/reports_publications/recstudy.html

www.umesc.usgs.gov/habitat_needs_assessment/emp_hna.html

POC: Bruce Carlson, (703) 428-9089

Mr. Carlson’s PowerPoint presentation is available at ***.

1530-1600	IWR-PLAN OVERVIEW	LEIGH SKAGGS, IWR-R
1600-1730	IWR-PLAN WORKSHOP	

The IWR-PLAN assists with plan formulation by combining user-defined solutions to planning problems and calculating the effects of each combination, or “plan.” ER 1105-2-100 requires that in recommending the NER plan it is “...where the incremental (subjectively valued) beneficial effects just equal the incremental costs, or alternatively stated, where the extra environmental value is just worth the extra costs.” The program can assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are best financial investments and displaying the effects of each on a range of decision variables. The system will formulate alternative combinations of solutions and compare their effects on up to ten user specified decision parameters. Derived parameters can be defined that are formulaic combinations of other decision variables. Constraints can be set, specifying minimum and maximum acceptable values for each decision variable. IWR-PLAN’s sensitivity module allows examination of the implications of uncertainty in decision variable estimates. Plans of interest can be identified and displayed throughout the analyses regardless of their cost effectiveness. The automated edit feature enables the user to account for non-additive plan effects.

IWR-PLAN builds upon the basic plan formulation and comparison framework of the DOS program ECO-EASY: Cost Effectiveness and Incremental Cost Analyses for Environmental Planning, developed within the Corps Evaluation of Environmental Investments Research Program. The IWR-PLAN system transforms ECO-EASY to a Windows95 or Windows NT operating environment while adding new functions. IWR-PLAN takes user-defined solutions to planning problems and externally generated estimates of each solution’s effects and can formulate all possible combinations of those solutions, considering user-defined relationships between solutions. For more information regarding IWR-PLAN or training opportunities, please contact: Leigh Skaggs, IWR, Technical Analysis and Research Division, (703) 428-9091. Or visit the IWR-PLAN home page for more information at (<http://www.wrsc.usace.army.min/iwr/>).

INLAND NAVIGATION SESSION (2)**SESSION ORGANIZER
DAVID GRIER, IWR-N****1300-1330****INLAND WATERWAY USER
BOARD****DAVID GRIER, IWR-N**

David Grier from IWR presented information on the Inland Navigation System and the User Board. There are 226 locks and 268 chambers. Of these 171 and 211, respectively, are considered commercially active. Additional data was presented concerning commodity movements on the system, age, and average delays at the locks.

Mr. Grier talked about the legislative actions which lead to the fuel tax collections, the establishment of the Inland Waterway User Board and the establishment and growth of the trust fund. He described the 11-member user board, where its members come from, and their duties. The board sets priorities of projects to be studied and constructed in the inland system. It also publishes an annual report to Congress describing the inland navigation system.

POC: David Grier, CEWRC-IWR-N, (703) 428-6438

1330-1400**INLAND NAVIGATION DATA****ARLENE DIETZ, CHIEF,
CEWRC-NDC**

The session focused on databases, product access, and special services offered by the Navigation Data Center (NDC) and the Waterborne Commerce Statistics Center (WCSC).

There are databases on locks, commerce, vessels, ports and waterway facilities, and dredging. The Lock Performance Monitoring System (LPMS) has detailed data on the information collected at the locks. Commerce and vessel data is available from WCSC. There is dredging data available from the NDC and the ports and waterway facility data is available in the Ports series publications. Much of this data is also available on CD (which were distributed at the session) and from the NDC web page. Most of it will also be available on the new OMBIL, which is under construction.

There is an evolution going on which will make the data primarily web based. The attendees were encouraged to look at the available data, especially that being put on OMBIL (presently viewable on <http://www.ombil.com/>) and suggest what data is valuable to the field people.

POC: Arlene Dietz, CEWRC-NDC, (703) 428-9061

1400-1500

**IWR-NAVSYM SIMULATION
MODEL – CASE STUDY
GIWW**

KEITH HOFSETH, IWR-R

Keith Hofseth, IWR-R, presented a background discussion of the new navigation analysis tool, the IWR-NAVSYM waterway simulation model. The model was developed with such waterways as the Atlantic WW, the GIWW, and the Columbia River in mind for use in investigating possible system improvements. It is a discrete event Monte Carlo simulation used to model the movement of tows on a system. The model is scenario-based, in which the user defines the waterway by specifying ports, modes, reaches and locks.

The model runs on Windows 95/NT systems and uses MS-Access for its internal database. Graphics are generated by Visual Basic while computation routines are built on C++. IWR-NAVSYM is designed to be very easy to use. It does not require operation by an "expert" and is very portable for use with different systems. Its limitations are that it is not a life cycle model and it is not a general equilibrium model; it can only model single chamber locks and it does not constrain fleet size within a simulation. (That is, it is possible for the model to generate shipment numbers which exceed the amount of tows and barges which actually use a waterway.) The model is still being improved and goals for the future include handling of two-chamber locks, intelligent route selection, conservation of tows (fleet constraint), equilibrium adjustments, and accommodation of high and low water flows.

The model description was followed by a real-time demonstration, which ably showed its ease of use, the user interface, the simplicity with which scenarios can be developed, and how it reports results. The IWR-NAVSYM is a highly accessible model useful for rather straightforward assessments of possible waterway navigation improvements. It does not feature the complexity of the larger models now being used in the system studies for the Ohio River and the Illinois Waterway-Upper Mississippi River System, nor is it intended to supplant those models.

POC: Keith Hofseth, CEWRC-IWR-R, (703) 428-6468

1530-1630

CASE STUDY – OHIO RIVER

**BUD LANGDON, LRH-NC
BILL FRECHIONE, LRP-PD-F
MARK LISNEY, LRL-PD-E**

Background: The Ohio River System consists of 60 locks and dams on 8 rivers holding over 2,854 miles of navigable channel and a total drainage area of 204,000 square miles encompassing 14 states. The Ohio River flows from Pittsburgh Pennsylvania to Cairo Illinois meeting the Mississippi River. The Ohio River System moves around 270 million tons annually; the Main Stem alone moves nearly 240 million tons annually. The major commodity moved is coal, comprising about 60% of the total cargo transported. Most of the coal ends up at waterside utilities in the basin.

Changes: A total of 19 Projects are being studied over the ORMSS analysis period.

Study Objective: Develop a long-term investment strategy over the next century for a group of sites. Historically, a study has been focused on only one site at a time instead of a package of several sites.

Schedule: The Main Report was scheduled for completion in January 2002. Due to current funding constraints, the completion date has been extended to Jan 2003. In order to meet WRDA 2000, the first two investment recommendations are going to be spun off as “Interim Reports” which are scheduled to be completed in March 2000.

Investment Options:

Small Scale Improvements

Large Scale Improvements

Study Process:

Traffic Forecasts/Rates

Existing System: Rehabs, Maintenance

Alternative New Investments/Timing

Environmental Impacts

Models and Sensitivities: The analysis is very sensitive to frequency / duration of closure events rather than total system capacity. The Life Cycle Lock Model was created to verify and adjust the closure schedule.

POC: Bud Langdon, CELRH-NC, (304) 529-5635

1630-1730

**NON-TRADITIONAL
BENEFITS**

**DR. MARK L. BURTON,
MARSHALL UNIVERSITY**

**DR. LARRY BRAY,
TENNESSEE VALLEY
AUTHORITY**

Dr. Bray presentation focused on three areas of analysis, the Marginal Social Cost-Marginal Social Benefit Paper (MSC-MSB), the Data Generator (TVA’s Fuel Tax and River Efficiency Model), and the NED implications of inland waterway use as they relate to pollution abatement.

The MSC-MSB paper attacked the perception that the government subsidizes water transportation. Previous analysis compared marginal costs to marginal revenues whereas the MSC-MSB paper looked at marginal social costs to marginal social revenues. The analysis made use of the TVA Fuel Tax and River Efficiency Model. The model combines towboat records, LPMS data, vessel operating costs and TVA fuel consumption data to estimate gallons of fuel burned per ton-mile by river. This estimate can then be extrapolated into air pollution abatement benefit if substantial fuel is save by water routing. Dr. Bray noted that this is the most empirically challenging part of the exercise and more work is required to develop a defensible methodology.

Dr. Burton then discussed non-traditional treatment of shipper demands as applied to the Upper Mississippi study. He first noted that no one perform benefit-cost analysis better than the Corps of Engineers. He additionally noted that economic studies must be done properly as competition and conflict have raised the bar as to what level of analysis interested parties are willing to accept. Traditional inland navigation analysis assumes shippers will always demand the same quantity of barge transport until the price reaches the alternate mode costs at which time all transport would switch to the alternate mode costs. The non-traditional treatment assumes shipper demand for water transportation is best represented by a downward slopping demand curve which passes through the observed price/quantity combination. The advantages of this type of model specification are, 1) it produces a better theoretical approach that yield more defensible results, 2) it allows additional traffic to be drawn to navigation when navigation cost are reduced and, 3) it indicates that a measurable portion of water-compelled rail rate savings may be NED. Disadvantages include it is empirically challenging, it may lower NED values for projects that can accommodate increased demand at current cost levels and it is much more difficult to explain to industry and policy makers.

POC: David Grier, (703) 428-6438

Dr. Bray's PowerPoint presentation is available at ***

Dr. Burton's PowerPoint presentation is available at ***.

**MAY 19
MORNING SESSION**

**SESSION ORGANIZER
DENNIS WAGNER, CHIEF
CENWD-NP-ET-PF**

0830-0845	ADMINISTRATIVE DETAILS	DENNIS WAGNER, CENWD
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Morning administrative details were provided by Dennis Wagner, Acting Chief, Planning Division, NWD.

0845-0930	ECONOMIC ANALYSIS IN A COLLABRATIVE PROCESS PANEL DISCUSSION	GINA TRAFTON, CENWW-PL ED WOODRUFF, CENWD-WM BRUCE LOVELIN, EXECUTIVE DIRECTOR, COLUMBIA RIVER ALLIANCE TERRY MORLAN, ECONOMIST, NORTHWEST POWER PLANNING COUNCIL
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The panel presented the ongoing collaborative study of the potential to eliminate and/or restructure the dams along the Columbia River. The participants on the study team include representatives from the Corps, power companies, environmental groups, and many other interests. The primary study goal is to arrive at a joint solution for possibly

removing or modifying some dams along the Columbia in order to achieve other purposes, primarily environmental restoration of salmon habitat. This analysis gathered economists from within and outside the Corps (EPA, Bonneville power, Northwest Power Planning Council). This group actually developed into a team and help to set some common goals. Not all members joined the effort but the process developed some consensus. This process provided an interesting process to the normal practice of the Corps and an outside group working independently and coming up with separate conclusions.

POC: Gina Trafton, CENWW-PL-PF, 520-316-9437

Ms. Trafton's PowerPoint presentation is available at ***

Mr. Woodruff's PowerPoint presentation is available at ***

Mr. Morlan's PowerPoint presentation is available at ***.

0930-1030	ECONOMIC ANALYSIS IN OTHER AGENCIES	AUDREY PERINO, ECONOMIST, BONNEVILLE POWER ADMINISTRATION ELLIOT ROSENBERG, ECONOMIST, ENVIRONMENTAL PROTECTION AGENCY
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Audrey Perino, an economist with Bonneville Power Administration (BPA), and Elliot Rosenberg, an economist with the Environmental Protection Agency (EPA) outlined the economic analyses that are conducted in their respective organizations. Ms. Perino provided details on the BPA capital investment strategy in the post-deregulation era. The strategy is consistent with the market environment into which BPA federal power is sold. The electricity market is essentially a wholesale commodity market with many buyers and sellers, transparent pricing, and benchmarks available for federal power pricing. The intent of the strategy is to be sure that the Federal government should not make investments private entities competing in the market wouldn't make and that the Federal government should not accept a higher level of risk than the private sector would accept. Economists at BPA, therefore, use a private sector model of investment to determine capital investment, which includes the use of market discount rates, discounted cash flow analysis and shorter payback periods than those used at the Corps. The result is a strategy that guarantees the Federal government accepts no more risk than the private sector and pays no more for project cash flows than the private sector would.

Mr. Rosenberg then followed with a presentation on the economist role at EPA. EPA has very few economists that cover very large areas. This means that Mr. Rosenberg spends a lot of time addressing economic issues at a very macro level. His role is more managerial in nature. He serves on committees as needed, including the DREW (Drawdown Regional Economic Workgroup) studying the removal of dams on the Snake River.

In his agency, the role of economists is fairly limited. He often encounters issues within the agency where the skills of economist would be useful, but he has not been asked to participate. He is an advocate for a greater role of economics within his agency.

POC: Denis Wagner, (503) 808-3843.

Ms. Perino's PowerPoint Presentation is available at ***

1100-1145

THE REVIEW PROCESS

STEVE CONE, CHIEF, CECW-AR

Steve Cone, Chief of the Office of Management and Review of the Policy Review Branch gave the presentation on the review process. He covered seven topics including the Policy Review organization, review guidance, requirements for obtaining policy review, the review process and products, scope of the review, common problems and the Policy homepage.

The Policy Review Organization consists of the Office of Management and Review, the Office of Environmental Policy and the PCA team. The Office of Management Review has 7 review managers for NED type projects, whereas the Office of Environmental Policy has 4 environmental reviewers for restoration projects and the PCA team has 2 for PCAs and other agreements. The primary review guidance identified by Mr. Cone was EC 1165-2-203, which provides definitions of decision documents, implementation documents, the quality control plan, the quality assurance plan, technical review including its certification and findings and policy compliance review. It also defines the roles and responsibilities of the policy compliance review team, functional program managers and OASA (CW) and the requirements for obtaining policy review.

Mr. Cone closed with discussion of guidelines for review comments and common problems. The guidelines for review comments contain 4 principle elements, statement of concern, basis for concern, significance of the concern and the action needed to resolve the concern. Common problems in the review process include incomplete documentation, poor scheduling, ineffective follow-up, inconsistent review and poor communications.

POC: Steve Cone, CECW-AR-M, (703) 428-6472.

Mr. Cone's PowerPoint presentation is available at ***.

1145-1300

LUNCH – MANDATORY

**DR. LEONARD SHABMAN,
VIRGINIA POLYTECHNIC
INSTITUTE**

Dr. Leonard Shabman from the Virginia Polytechnic Institute spoke on the future of economists within the Corps at Wednesday's Luncheon. Dr. Shabman believes the Corps of Engineers needs to focus on large watershed restoration projects. He stated that Corps economists have strayed away from interaction with HQ and have become allies with industry on budget priorities. This he explains is a losing proposition. Traditional missions are declining and the Corps is a wasting resource where our budget is sought, not our expertise. He disagreed with the notion that complex Planning studies could be significantly expedited and noted that this was the same conclusion the National Research Council's Report reached.

He believes the Corps has the potential to be the Federal watershed restoration leader because of our expertise in hydrology. This may not mean new projects but perhaps modified projects. In order to fulfill this role the Corps needs to build constituencies within environmental and other groups that can grow projects. Planners have a role in restoration as they can identify tradeoffs (opportunity costs) and search for consensus. Currently there are four systemic barriers preventing us from reaching our potential. 1) The Corps work is project as opposed to program funded. 2) Other agencies do not believe we can do anything environmental. 3) Other agencies do not believe we can move out quickly. 4) Environmental restoration projects need to be done in multi-disciplinary teams. In order to move forward the Corps economist needs to step outside his role and advocate for changes in the organization.

POC: Mike Krouse, (703) 428-6217

CONCURRENT AFTERNOON SESSION

DEEP DRAFT NAVIGATION SESSION (1)

SESSION ORGANIZER

MONA KING, IWR-N

1300-1400

**INTERNATIONAL SHIPPING
TRENDS**

**MONA KING, IWR-N
DANIEL JESSEL, MARITIME
STRATEGIC INTERNATIONAL**

Part 1 – Containerized (Liner) Cargo (Ms. King)

This presentation focused on the US position in the high growth area of containerized cargo movement in the international shipping arena. This sector of shipping trade is characterized by rapid growth, consolidation, and technological advancement, both in the mode of transport (trend toward larger vessels) and sophisticated cargo planning and tracking. Trade TEU (Total Equivalent Units) throughput occurs at 350 ports worldwide. The top 30 ports comprise 60% of the market; eight are U.S. ports. Macro trends in commerce globalization, increased trade relations, and convergence of economic systems,

worldwide, has resulted in trade growth that has recently been documented to be as high as 6% in the United States. However, it is of current prevalent belief that this growth rate is unsustainable, and in the long term will converge to 3%, to mimic the growth of GDP in the United States.

Among the charts and graphical presentations were comparison of key US commodities by tonnage and values. It was noted that manufactured goods that comprise only 10% of the tonnage are 66% of commodity values. Growth rates by region for 1990 to 2010 US Liner trades were displayed. Containerized vessel growth dimensions over time to the current Maersk K-class and S-class vessels were presented. Notably, the Maersk S class vessels (currently the largest fleet) have TEU's capacities up to 6,600 and design drafts up to 47.5 feet. A possibility of a 15,000 TEU container vessel for the future exists. However, the effectiveness of such a large vessel would be contingent upon planned projections of port development and growth of ports. Larger containerized vessels is not a unilateral proposition; port infrastructure would have to expand accordingly to make such an expenditure cost effective and efficient. A key barometer that may affect the trend in vessel size is the shift in intermodalism of the Far East to US Pacific trade route. Currently, this route has a direct Far East to Pacific movement with hinterland transport eastward. However, a shift of manufactured production to the southeast of Asia, where lower labor costs exist, favors trade via an Atlantic trade route, through the Suez Canal, to the eastern US with hinterland transport to the west.

Part 2 – Bulkers and Tankers (Mr. Jessel)

This presentation focused on the trends in the Bulker and Tanker industry. Unlike the containerized industry there are thousands of owners/operators. It is a fragmented industry characterized by static technology, an aging fleet, slow growth, and uncertain profitability. It is a commodity industry that has a stable cargo composition and is cyclical. The typical Bulker commodities are coal, iron ore, grain, and bauxite/alumina. There has been no technological advancement in the last ten years and virtually no cost reduction over that time. As a result, the profitability has not been sufficient to renew the fleet. Since 1980 the average tanker size of a fleet has actually decreased. This is due to a shift of crude oil and products from the Middle East to other sources worldwide (as ports of origins have shifted). In 1992 a double-haul requirement was instituted for tanker vessels. There is also a shift in trend for seaborne dry bulk to Pacific port destinations. By the next decade dry bulk movements to Pacific ports are projected to overtake the Atlantic Ports. Freight rate volatility will most likely continue as this industry transits into the new millennium, in what is characterized as a “fiercely cyclical

POC: Mona King, (703) 428-7257

1400-1500

**NAVIGATION DATA
SOURCES**

**ARLENE DIETZ, CHIEF,
CEWRC-NDC**

Presentation focused on:

- NDC data bases
- Data and Product Access
- Special Services

An increasing amount of on-line navigation data is available through use of the Navigation Data Center Home Page

(www.usace.army.mil/inef/fuctions/cw/rtnusace.htm). All of the information provided in the hard copy “Waterborne Commerce of the United States” plus more is available off this home page. A sample of the data information available includes:

- Waterborne Commerce of the U.S. to include tonnage and vessel trips by commodity for major ports and waterways.
- Monthly tonnage data and comparisons.
- Public Domain databases – aggregated origin-to-destination information of foreign and domestic waterborne cargo movement by region and state.
- Waterborne tonnage for principal ports and U.S. States and territories.
- Vessel characteristics.
- U.S. port facilities.
- Dredging information.

Also available from the same home page –

- Ranking of U.S. Ports.
- Annual summary of lock statistics.
- Trends in commodity movements.
- U.S. Waterway tonnage comparison (% change and comparison of short tons).

In addition to the above data sources, there are many other transportation data links from the NDC home page which can be used to access additional transportation data.

Finally, NDC would like to hear from you regarding what other kinds of standard and specialized data information will be needed in the future. Please provide your comments and suggestions to Arlene Dietz, Chief, Navigation Data Center.

POC: Arlene Dietz, CEWRC-NDC, (703) 428-9061

1530-1600

**CHARLESTON HARBOR
SIMULATION MODEL**

**BECKY McCLARY, CELRH-NC
JEFF ADKINS, CESAC-EN-P**

Mr. Adkins presented an overview of the Charleston Harbor Channel Deepening Study, describing existing conditions, ongoing construction, and planned future development. Construction of a deepening and widening project has begun in Charleston, but additional

container berths are planned, which may require additional harbor improvements. Charleston District is investigating the need to further widen the Wando River for the increased traffic and to build a turning basin for the additional berths.

Ms. McClary presented the simulation model being used to analyze the potential efficiency gains from the proposed additional widening and turning basin. The Charleston model was adapted from the Waterways Analysis Model (WAM). WAM is a simulation model traditionally used for analyses of improvements to inland navigation systems. The model, which is written in the SIMSCRIPT programming language, simulates the movement of vessels within Charleston Harbor, and measures efficiency gains in a systems context. It is a stochastic model, using statistically derived curves representing ship arrival patterns and other operational parameters, thus incorporating the impacts of randomness within the system. The animation features of SIMSCRIPT allow displays of harbor use by vessels, allowing analysts and decision-makers to literally “see” the competition of vessels for the channels, berths, and turning basins.

POC: Jeff Adkins, (843) 727-4101

1600-1730

**VESSEL OPERATING COST
MODEL OVERVIEW AND
DEMONSTRATION**

**CHRISTINE BRAYMAN,
IWR-N**

**DANIEL JESSEL, PRESIDENT,
MARITIME STRATEGIES
INTERNATIONAL**

New updated and revised VOC data, as well as a model which allows manipulation of the data, prepared under contract for IWR, were presented. Obtaining this highly proprietary data is not easy but must be done regularly to maintain currency. The contractor has made some significant modifications to make the data both more current and responsive to the needs of the field. This is achieved by using multi-year “moving averages” for vessel costs and fuel. With the new model the user also will be allowed to input local variations in costs (such as vessel flag) where this is appropriate. The model will indicate when variations are used and new guidance will require that this information be displayed in the reporting document.

POC: Christine Brayman, (703) 428-9085

RISK ANALYSIS SESSION (2)

**SESSION ORGANIZER
SHARON BOND, CHIEF,
CELRL-PD-E**

1300-1400

**RISK ANALYSIS UPDATE –
DAM SAFETY ANALYSIS**

DR. DAVE MOSER, IWR-R

Dr. Moser began his presentation by outlining revised risk analysis guidance contained in the new version of Chapter 6, ER 1105-2-100. He noted that risk and uncertainty considerations, at least in the form of a sensitivity analysis, are specifically required for

M&I water supply, inland navigation, deep draft navigation. Further a life cycle approach and probabilistic display of benefits and costs are required for hurricane storm damage reduction and flood damage reduction. Dr. Moser then discussed areas of research in risk analysis. The Risk Analysis for Water Resources Investments program current focus is on developing risk-based evaluation and decision making framework for environmental restoration and deep draft navigation studies. Additionally, it is continuing to develop risk analysis tools and procedures that cross-cut a variety of Corps Business areas. Work units such as risk analysis application for cost estimating and risk management in decision-making support this effort.

Dr. Moser then discussed the new R&D program for FY99, Risk Analysis for Dam Safety. The program is a cross-disciplinary effort with a goal of developing risk analysis procedures to assist in making dam safety investment decisions. The program will consider all sources of risk in the evaluation including hydrologic, seismic and internal. The procedures will address uncertainties in probabilities and consequences associated with dam failure. Additionally, Dr. Moser noted that any risk analysis procedures developed for dam safety evaluation must be suitable to agency culture, consistent with other federal dam owners and conform to our "Public Trust" responsibilities.
POC: Dave Moser (703) 428-8066

1400-1500

**CASE STUDY – HERBERT
HOOVER DIKES**

**ERIC RAASCH, CESAJ-PD-D
DR. DAVE MOSER, IWR-R**

Major Rehabilitation requires economic analysis to justify huge costs involved in doing the work. The economics analysis conducted for major rehabilitation projects require risk and uncertainty analysis. Herbert Hoover Dikes in Florida has a total project cost of \$167,000,000. The present dike problems are caused by through seepage and under-seepage and piping caused by water from Lake Okeechobee. Seepage and piping vary by the water level of the lake, and they can cause both low velocity and high velocity breaches to the levee system.

Modeling attempts to be a representation of reality. When previous events affect the probabilities of later events, frequency models like HEC- Flood Damage Analysis program are not applicable. A life cycle model is applicable. Hurricanes effect water levels and only occur in two of the four seasons. Results in one period could effect probabilities for the next period. The life cycle model used in the analysis was based on seasons and had 4 periods per year. It cost about \$55,000 from a contractor and could compare the various scenarios so that the model was usable in both estimating benefits and alternative selection.

POC: Eric Raasch, (651) 290-5437

1530-1630

**RISK ANALYSIS FOR
RESTORATION PROJECTS**

KEITH HOFSETH, IWR-R

WES, HEC and IWR are involved with this team study to begin bringing risk and uncertainty analysis into restoration project evaluations. They are attempting to deal with

the uncertainty in estimating the ecological outputs of bio- and hydro-models, as well as the cost estimates associated with restoration projects. Their objectives are to develop a risk based framework that will improve the quality of our decision making, develop guidance, and give assistance to the field. The study is still in the infancy stage. The study team is searching for an actual District study to help them focus their efforts, and Mr. Hofseth emphasized that they have their own money so the team's services are free to the District. They are also looking for a field review group.
POC: Keith Hofseth, (703) 428-6468

1630-1730

WHAT MAKES A GOOD RISK ANALYSIS? - PANEL DISCUSSION

**DR. DAVE MOSER, IWR-R
MITCH LAIRD, CELRL-PD-E
GERALD MELTON, CESAD-ET-P
STEVE CONE, CHIEF, CECW-AR**

The Risk Analysis panel discussion consisted of Dr. Dave Moser from IWR, Mitch Laird from the Louisville District, Gerald Melton from the South Atlantic Division and Steve Cone, Acting Chief of the Policy Review Branch Headquarters. While all of the panelists have been intimately involved in economic analysis, the diversity represented by working professionals from all organizational walks of the Corps Family gave the discussion a unique depth and sense of focus. Dr. Moser began the discussion by emphasizing that the real purpose of Risk and Uncertainty analysis is to make better decisions; decisions that are not only more cost efficient but also ones that empower the Corps and our local sponsors to make more informed choices. He emphasized that a good analysis (i.e. one that is really useful) needs to start out with a well-defined question. In addition to a well-defined question Dr. Moser emphasized several other points, some of which were reiterated by the other panelists. He specifically pointed to the idea that our analyses should be based on sound scientific methodology, and that we should use the best data reasonably available. The other panelist echoed this sentiment and added their own perspectives on R&U Analysis.

Mitch Laird from the Louisville District added some practical advice with respect to conducting a study based on Risk and Uncertainty. He emphasized, among other things, that the process is a collaborative one, especially between the Hydrologic and Economic components of the study team. As part of this collaborative effort he felt it was important to not exclude any members of the team and to honestly evaluate the inputs of other study contributors such as the local sponsor. This sense of inclusion tends to foster a feeling of ownership and leads to a more thorough and well thought out analysis. Mr. Melton from the South Atlantic Division emphasized a broader picture. He focused much of his discussion on the idea that assumptions underpin an analysis. His point was that simply performing the mechanical aspects of an analysis correctly isn't enough to insure a quality product. It is the assumptions on which a model is built that will determine whether the extrapolation is a good representation of reality. He also stressed the idea that while conducting an analysis you can not capture all of the details. Consequently, it is crucial to focus on what is really important and to not allow oneself to be distracted

from the big picture by extraneous details. Some risks are de-minimus and should be treated as such.

Mr. Steve Cone, Chief of the Policy Review Branch Headquarters tied together a sentiment that the entire panelist had mentioned. He reiterated that not only are we in the business of finding opportunities in water resource use issues, we are also in the business of effectively communicating our vision. It is not enough to come up with a feasible engineering solution to a given problem; we also have to effectively communicate how in fact our proposed solutions are going to benefit the Nation. He emphasized, that our analysis must add value to the decision making process. It must tell our customers about our project and what its performance is likely to be so that they can make informed investment decisions. That after all is the very purpose of all our studies.
POC: Dave Moser, (703) 428-8066

**MAY 20
MORNING SESSION**

**SESSION ORGANIZER
PAT MUTSCHLER, ECONOMIC
POLICY ADVISOR, CENAB**

0830-0845 ADMINISTRATIVE DETAILS PAT MUTSCHLER, CENAB

Pat Mutschler provided administrative details for the morning session.

**0845-0930 VIEWS FROM THE CHIEF DR. JIM JOHNSON, CHIEF,
CECW-P**

Civil Works Planning Chief, Dr. Jim Johnson, having worked side by side with such Corps legendary employees as Bob Gidez and Bill Donovan, encouraged creative and cutting-edge performances by each economist while on our Corps trip with other agencies to the future. He offered the three areas of *people, process, and program* for consideration.

1) Regarding *people* he cited our need to build a full-performance team and to use the team approach.

2) Regarding *process* he called for us to improve the Corps planning capability to manifest success-oriented planning that gets something out at the end and makes sure we get every benefit out there. He discussed the need to improve procedures to expedite report preparation, review, and processing, and he said how we would streamline and simplify regulations, and that we would power down continuing authorities. He noted that historically the P&G have been interpreted in one approach, but that in the future a less-restrictive approach might be used.

3) Regarding *building the program* he cited how we could integrate the "planning-construction pipeline" into our business process, while improving the financial cost sharing agreement feasibility report successes and output, and while also increasing outputs on special authorities and initiatives. He suggested a setting of projects

manifesting boundaries between economic development and environmental activity, and he noted that planners build programs. He suggested that our leadership focus on building a Civil Works pipeline, providing a strong Commanders access to Planning Chiefs, building planning competence and creativity, and organizing for Planning and Civil Works success.

3. In answering how we might both achieve "success-oriented planning" and also produce unbiased and objective consideration and analysis of non-structural as well as structural alternatives for optimal solutions, Dr. Johnson cited the recent National Academy of Sciences report along with environmental groups calling for greater attention to non-structural options. He noted that we could use these same findings of such broad task groups to reevaluate our historical structural project focus, taking the opportunity to adjust where appropriate.

POC: Harry Kitch, (202) 761-1969

Dr. Johnson's PowerPoint presentation is available at ***

0930-1000

OMB QUESTIONNAIRES

RON CONNER, CECW-PD

Ron Conner made a presentation on OMB questionnaires highlighting the new approval requirements for submission and approval prior to initiation of a questionnaire.

Divisions now submit proposed questionnaires and a submittal package directly to OMB and DOD for approval. The submittal package includes description of the purpose of survey, where and when it will be conducted, survey population, sample size, selection methodology and direct references to questions taken from the approved questionnaires. The package is submitted electronically to OMB, who has 10 workdays to respond. 3 questionnaire packages have been submitted to OMB under the new procedure, with an average response time of 1.5 days.

POC: Ron Conner, (202) 761-0132

Mr. Conner's PowerPoint presentation is available at ***.

1000-1030

**NEW ABILITY TO PAY
REGULATION**

DAVID HILL, CEWRC-IWR-R

The general idea of the Ability-To-Pay rule, since the Congressional directive for its establishment in 1986, has been to provide a reasonable avenue for local sponsors to offset higher non-federal cost shares. Qualified local sponsors must demonstrate both a need for a Corps project and a lack of economic means to meet the full cost share. The form of the rule has been controversial from its first inception in 1989, with the central contention being that the rule in practice was too stringent and failed to allow projects to qualify for reductions. Following additional Congressional directives in subsequent Water Resource Development Acts (WRDA), the ATP rule was revised in 1992 and again in 1995. Still very few projects qualified and as the cost share rules changed once again in WRDA '96, Congress issued a strongly worded directive to revise the rule and even went as far as to spell out what could be used and what could not be used as qualification criteria.

version of this rule. In hopes of finally developing a workable rule for the field while being both palatable to the Administration and Congress, the idea arose of creating a database of all the potential projects that such a rule would affect. A myriad of rule options were conceived based on the historic form of the rule and the Congressional directive that the qualification be based on County Per Capita Income and Non-Federal Project Construction Cost. A comparative static analysis was performed showing the effects of each rule against the database of projects for two specific issues; 1) how well the rule reached the policy objective, i.e., the number of projects which qualified and, 2) the Corps' program budgetary impacts, i.e., how much cost was being transferred from the non-federal entity to the Corps. A rule option that appeared to maximize the policy objective of the rule while minimizing its cost was recommended to Corps Headquarters. Following its acceptance there, it was passed to the Assistant Secretary's Office (ASA) and the Office of Management and Budget (OMB) for their approval. At this time, the final form and wording of the rule is in limbo as the parties seek compromise over various details.

POC: Dave Hill, (703) 428-9088

1100-1200	ECONOMIC ANALYSIS IN NON-TRADITIONAL AREAS	PAT MUTSCHLER, CENAB ROGER HABERLY, CELRB-PE-PE JOE MANTEY, CELRE-EP-P KEN CLASEMAN, CESAM-PD
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Ken Claseman (CESAM-PD) summarized the work that Mobile District is conducting for other government entities. This work includes a water supply study for the Panama Canal Commission, facility replacement for the Environmental Protection Agency, and analysis for the Department of Defense in support of Base Closure and Realignment activities. Mr. Claseman advised that the exercise of initiative by study managers and economists could generate a significant quantity of spin-off work from existing studies.

Roger Haberly (CELRB-PE-PE) reviewed the progress of a 3 - 5 year economic reevaluation of a harbor study that is being conducted in support of the operations and maintenance program for his district. The study focuses on optimizing channel depths and dredging frequencies given the volume and type of waterborne traffic on lakes Erie and Ontario and predicted shoaling rates in associated access channels. The lesson learned is that opportunities exist in each district's operations and maintenance program to provide valuable analysis and that this capability will be more important in the future as operations and maintenance budgets are prioritized.

Budgeting, environmental restoration, impact analysis of base closures, and life-cycle cost analysis are the unique types of work that Pat Mutschler (CENAB) reports are currently being conducted by the Baltimore District. However, perhaps the most creative example of analysis provided by economists in non-traditional areas lies in the area of historic preservation where options to preserve or replicate existing structures were

evaluated. Carefully prepared and complete records of existing and prior analyses were strongly recommended since the ability to conduct future work in non-traditional areas, perhaps by different personnel, may be dependent on, or facilitated by, experience currently gained in pioneering analyses.

Joe Mantey (CELRE-EP-P) discussed the activities associated with the Lake Michigan Potential Damage Study, work that is being conducted on behalf of the Lake Michigan International Joint Commission. Compared to studies typically performed by economists, this endeavor represents an innovative approach since it relies on GIS data and the analysis of land use patterns to quantify damages due to erosion.

POC: Pat Mutschler, (703) 428-6368

Ms. Mutschler's PowerPoint presentation is available at ***.

Mr. Haberly's PowerPoint presentation is available at ***.

Mr. Claseman's PowerPoint presentation is available at ***.

**CONCURRENT AFTERNOON SESSION
WATERSHED CONTINUED (1)**

**SESSION ORGANIZER
BILL HUNT, CESAJ-PD-D**

1300-1400

**EVERGLADES – CASE
STUDY**

BILL HUNT, CESAJ-PD-D

Mr. Hunt's interesting presentation was accompanied by slides. Handouts were made available, including a tri-fold summary brochure, an executive summary *Overview* document, a compact disk containing the 10 volume Feasibility Study, and a poster with a satellite photo, diagrams, and text summarizing the South Florida water management system. The presentation included some historical and background information about South Florida's hydrological and ecological systems. Problems with flooding and draught, economic development and water supply for urban and agricultural use, led to the 1948 authorization of the Central and Southern Florida Project (the C&SF Project), which has been developed and operated by the Corps and the State of Florida's South Florida Water Management District (SFWMD) since then.

The recently completed Comprehensive Review Study ("The Restudy") was authorized to investigate ways to re-engineer the C&SF Project mainly to: reverse the decline in the ecological health of the Everglades, Lake Okeechobee, and South Florida's bays and estuaries; reduce the increasing frequency of water shortages for urban and agricultural users; and maintain flood protection. The plan formulation process involved over 100 active participants from various agencies, governments, and organizations, extensive use of a web site, and a complex hydrological simulation model, the South Florida Water Management Model (SFWMM). There was a significant public participation process.

The C&SF Restudy's recommended plan includes water storage and operational changes mainly designed to make the hydrology more like it would have been in the pre-drainage

natural system. The estimated project construction cost is nearly \$8 billion (1999 prices), with annual operating and monitoring costs approaching \$200 million.

Economic evaluation work included cost effectiveness evaluation, incremental analysis, and impact analysis. No benefit cost analysis was done. Cost effectiveness and incremental analysis were built into the plan formulation process, rather than explicitly separate processes conducted by economists. The economics team's focus was mostly on impact analysis. NED costs, and NED effects of water supply impacts, were monetized. Agricultural water supply impact analysis was a unique process which involved translating simulated changes in evapotranspiration to changes in crop yield. Economic assessment of other impacts (flood control, navigation, fishing, recreation, etc.) were discussed, and while the hydrological and/or ecological effects were not known in sufficient detail to allow economic effect evaluation for these areas, alternatives were ranked, and a baseline of relevant economic activity was developed for the study. Regional economic impacts were also addressed. The largest regional effect, relatively insignificant on a study area region-wide basis (16-county area), is expected to be due to project spending, although there is likely to be a (smaller) negative impact as agricultural lands are taken out of production to be used for project purposes.

This was a unique and interesting project and study. The expected economic impacts include small positive changes in water supply, very small positive effects on navigation, potentially significant positive effects on recreation and fishing, some positive flooding effects, and some small regional economic impact effects.

Mr. Gary Hershendorfer of NAD asked if the study incorporated non-structural elements such as pricing and conservation for water supply. The answer is yes. The urban use projections were accomplished using the IWR-MAIN forecasting software package, and included a conservation scenario, which was used. In addition, all utilities in South Florida use increasing block rate pricing, a progressive pricing schedule. Also, there is a well-organized water shortage program in both the urban and agricultural areas, which has been successfully employed to deal with drought situations.
POC: Bill Hunt, (904) 232-1020

1400-1500	ECONOMIC EVALUATION OF NON-STRUCTURAL MEASURES	DR. DAVE MOSER, IWR-R CAROL HOLLOWAY, CESWG-PE-E
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Part 1 – Dr. Dave Moser

There are three common non-structural measures: Flood-proofing, Flood Warning Preparedness, and Permanent Relocation. Flood warning preparedness involves implementing a warning systems that provides lead-time for threatened flood victims to attempt to lessen the negative impacts from flood event. This alternative when successfully implemented should provide the specific information of when and how much. Evaluation of this alternative is difficult in that there is no empirically based

method available to accurately quantify the benefits associated with the “with project” conditions. Good forecasting needs to provide time for response, accuracy in flood crest timing, and accuracy in predicting flood crest elevation. All benefit quantification methods rely on heavy doses of judgment by the analyst. Most currently used methods rely on shifting the “without” project stage-damage curve or revising the depth-percent damage relationship. Presently there is much uncertainty regarding the reliability of flood warning preparedness.

Risk and Uncertainty techniques could be used in a “Response Model.” The model should account for the uncertainty associated with the warning and response process. The response model would result in a distribution of percent reduction in damages for each warning lead-time scenario. This would be the basis used to shift the depth-percent damage curve. The strengths in using a response model are that it explicitly provides the conceptual framework of warning and response process and quantifies its inherent uncertainty. The weaknesses in using a response model are that the input used is subjective, the damages reduced are generic and there is no empirical verification of the results. Another primary issue concerning the flood warning preparedness alternative deals with the costs associated with responding to a warning. The costs incurred from responding to “false alarms” can have the effect of increasing damages, (e.g. non-productive labor, etc.).

Another non-structural measure where R&U techniques should be employed is Permanent Relocation. There has been much controversy associated with the economic evaluation of permanent relocation measures. Ideally, the measure will permanently remove most of existing activities in the area considered for permanent relocation; the exception being some utilities and transportation infrastructure remaining. This then would allow for a permanent change in land use within the relocation area, hence a positive benefit. You want to avoid leaving a neighborhood with some in and some out resulting in a checkerboard look. Characteristically relocation measures are frequently considered in combination with structural. Typically relocations are proposed for the most frequently flooded properties. Choice of properties relocated should consider neighborhood aspects not just flood damage susceptibility.

A provision of the Uniform Relocation Assistance and Real Property Acquisition Policies Act was that relocation costs not be classified as NED costs. Under Principles and Guidelines, the economic evaluation of permanent relocation uses flood damages avoided as primary benefit. This is the same as structural formulations. Purchase of property complicates correct benefit measurement. This is an accounting problem. We assume that Willingness To Pay (WTP) is equal to the damages avoided. Economic theory predicts that capitalized privately born losses represent the reduced land value due to flooding. Actual markets being imperfect reflect that this is not so. Studies empirically have shown that the assumption is not true. Adjustments can be made using things like shadow prices. Benefits can be measured as either the reduction in present value of expected annual damages or the increase in land value with project. Benefits are either the landowner’s WTP to reduce the cost or other’s WTP to reduce the cost. These are

then externalized costs. Several Federal programs externalize flood costs from landowner to others. Examples include:

- Public flood emergency response
- Public utility and infrastructure maintenance
- National Flood Insurance Program
- Casualty loss income tax deductions

The difference in value between flood free land and flood prone land equals the present value of expected annual damages. The WTP for a structural plan that reduces the flood risk to zero is measured as the present value of expected annual damages which is equal to the increase in land value. In a relocation, the increase in land value as a result of the relocation is zero. The WTP of the landowner for a relocation plan that reduces flood risk to zero is equal to zero. There is no change in the landowner's wealth assuming risk-neutrality. It is frequently easier to measure the externalized flood cost (subsidized amount).

Other relocation benefits include reduction in EAD to public utilities and public improvements, reduction in emergency costs, reduction in disaster relief, and value of new use of vacated land. The value of new use of vacated land benefit is an important one that is generally critical to project economic justification. One category to consider is environmental restoration for use of vacated land. Justification is based on non-monetized benefits. Cost effectiveness of restoration is calculated using only "remaining" relocation project costs. This considers only those costs not covered by relocation benefits

Proposed wording in a Section 214 of WRDA 99 states: "The Secretary shall include primary flood damages avoided in the benefit base for justifying Federal non-structural flood damage reduction projects." This does not make sense. It implies double counting.

Part 2- Carol Hollaway, CESWG-PE-P

Background

Cypress Creek is located on the Texas Coastal Plain, in northern Harris County which is part of the Houston Metropolitan Statistical Area. Cypress Creek is a tertiary tributary of the West Fork of the San Jacinto River and drains approximately 320 square miles of northern Harris County and eastern Waller County. It is formed by the junction of Snake Creek and Mound Creek in Waller County and flows easterly for a distance 34 miles to its confluence with Spring Creek immediately north of the Houston Intercontinental Airport. The primary cause of damaging floods along Cypress Creek is increased development of the floodplain. In 1970, the Harris County portion of the Cypress Creek watershed contained 26,703 persons. By 1980, the Cypress Creek watershed housed 140,916 persons. By 1990, the population had grown to 247,805 for an average annual growth rate of 5.8 percent over the decade. This rapid growth has induced flooding along Cypress Creek. The dynamic growth of residential and commercial development in the watershed east of Highway 290 in Harris County increased runoff and intensified flood

damages. Several tributaries have been improved, providing an even greater quantity of water for the main stem to carry. Inadequate local drainage and the growth of brush and trees in the channel have aggravated flood problems. Also the sandy slopes of Cypress Creek have eroded into the channel, further reducing its carrying capacity.

Flood characteristics

The Texas Coastal Plain is flat producing floods characterized by slow rise, long duration, and low velocities. Flooding typically occurs over an extended time period, generally starting with long duration rainfall and street flooding. Because the streets in Houston are used for tertiary drainage, access becomes problematic during flood events. Homeowners, who typically commute to the CBD or other business centers within Houston, experience difficulty returning to their homes in order to take precautions against flooding.

Site characteristics

Much of the general aesthetic appeal of the study area stems from its wooded, relatively undeveloped character. The predominant land use within the buyout areas is residential. Services are provided within a few miles of all the targeted structures by clusters of commercial properties and businesses. The land use pattern is typically suburban. Many of the targeted residential structures sit on large or multiple lots which suggest a rural ambience. Some residential properties have horse barns or other mixed-use outbuildings on adjacent lots. All of the targeted structures were built before the implementation of flood plain regulations. These regulations, and the goal of abating future flood damages, will have a strong influence on the future use of the targeted properties and contiguous undeveloped properties.

Structure Characteristics

Over 96 percent of the structures inventoried within the estimated existing median 0.2 percent annual exceedence probability floodplain are residential. Most are built on slab foundations with no basements. Harris County entered the Flood Insurance program in 1972 after which builders were required to build first-floor elevations at or above the FIRM 100-year elevation. During the reevaluation of Cypress Creek, which began with a new structure inventory in 1990, 5,000 structures were counted within the midlife Standard Project Floodplain. Of these, 1,600 lay within the 1% annual exceedence probability floodplain. The housing stock within the 1% annual exceedence probability floodplain appears not to be increasing in number, but rather is aging over time and depreciating with repeated flood events. The success of FIA flood plain management regulations makes economic justification of expensive structural alternatives difficult as the structure inventory within the floodplain degrades over time.

Plan Formulation

In 1990, the Galveston District began a reanalysis of the Cypress Creek authorized project that entailed full channelization of the stream. The initial purpose of the reanalysis was to update the costs and benefits of a structural solution to the flooding problems of Cypress Creek by updating the baseline conditions upon which a remedial action is applied. Primarily the intent was to quantify the contributions to national economic

development (NED) associated with reducing urban flooding with a channelization project. A secondary purpose was to maximize NED by evaluating modifications to the authorized plan. The results of the reanalysis produced a favorable structural plan that failed to satisfy the multiple interests of the local sponsor. In 1994, the Galveston District and the local sponsor, the Harris County Flood Control District (HCFCD), entered into a cost-sharing scope of work for general reevaluation of Cypress Creek. The Galveston District adopted the hydraulic and hydrologic model of the local sponsor and expanded its investigation of possible flood solutions using risk and uncertainty (R&U) analysis, relying on the economic field survey performed by the District during late 1990. Preliminary findings of the R&U analysis suggested that a structural solution was still attainable if limited to only addressing the flooding along very specific segments of the Creek. Further refinement of the costs and benefits of the potentially favorable structural solutions revealed that no structural plan was economically justifiable.

Following this realization, investigations focused on a range of nonstructural alternatives that could possibly provide some, albeit incomplete, relief to flood victims. Nonstructural plans evaluated included raising the first floors of structures and both mandatory and voluntary buyout of structures.

Non-structural Measure Determination

Plans to raise the first floor elevations of flood-prone structures to a target elevation 1.5 feet above the 1 percent annual exceedence probability flood elevation were fully analyzed before being abandoned due to issues regarding engineering feasibility and local sponsor support. Plans to buyout residential structures damaged by existing median 50, 20, 12.5, 10, and 4 percent annual exceedence probability flood events were also investigated.

Economic Analysis

Risk and uncertainty (R&U) analysis was applied to the structure database during the initial screening of alternatives for the GRR during 1994. Risk and Uncertainty Lotus 1-2-3 spreadsheets, designed by IWR for economic analysis and HEC for hydrologic and hydraulic analyses, were employed to generate potentially viable structural solutions to flooding. Following the initial screening of alternatives, those plans that were identified as potentially viable were subjected to refinement using the static HEC-FDA model. The static model was also used to identify target structures for nonstructural alternative analysis when it became apparent that no structural solution was economically feasible. Finally, the array of nonstructural plans was subjected to R&U analysis with the application of HEC's 1997 Provisional Version 1 release of NexGen, the Risk and Uncertainty-enhanced interpretation of the FDA analytical package.

Nonstructural Solutions to Flooding

Buyout was evaluated for those residential structures damaged by floods with annual exceedence probabilities of 50, 20, 12.5, 10, and 4 percent. One residential structure was identified within the 50 percent annual exceedence probability flood zone. This structure was analyzed for buyout based on its annual expected frequency of inundation as were the following:

- 38 structures from 50 % to 20 % annual exceedence probability flood elevations
- 38 structures from 20 % to 12.5 % annual exceedence probability flood elevations
- 37 structures from 12.5 % to 10 % annual exceedence probability flood elevations
- 172 structures from 10 % to 4 % annual exceedence probability flood elevations.

Nonresidential structures were excluded from analysis of nonstructural solutions since their uses were incompatible with relocation. Examples of commercial and public uses within these targeted areas are a horse farm, a cemetery, a greenhouse nursery, a fire station, a sewage treatment plant, and an arboretum.

Residential structures were evaluated for buyout based on each structure's damage potential from frequent flood events. This nonstructural solution entails the taking and demolition of structures with compensation to owners and residents for their property and relocation plus resettlement expenses. Benefits from permanent relocation can be classified into five categories:

- the value for the new use of the vacated land
- reduction in damage to public property, such as roads and utilities
- reduction in emergency costs
- reduction in the administrative costs of disaster relief
- reduction in flood insurance subsidy.

This buyout analysis includes only the evaluation of a reduction in flood insurance subsidy and a reduction in post-disaster emergency costs. A change in land use is not anticipated since the targeted structures are surrounded by unimproved lots and by scattered development that conforms to FEMA floodplain regulations and County building codes. The implementation of this project would not produce contiguous parcels of land of sufficient size to suggest an alternative land use.

The flood insurance subsidy (externalized flood damages) is determined by deducting the policy holder's average annual insurance premium, annualized expected deductible and annualized expected uninsured losses from the average annual equivalent loss and the administrative costs of flood insurance. The insured loss assumes coverage of all physical costs including damage to the building structure, damage to contents, and cleanup of the structure and contents (National Economic Development Procedures Manual-Urban Flood Damage, IWR Report 88-R-2, March 1988).

Uncertainty in the calculation of the subsidy is reflected in the average annual equivalent damages and the annualized deductible. Premiums calculated are based on current rates charged for properties within the 1 percent annual exceedence probability FEMA floodplain of Harris County, Texas. Average annual equivalent damages were calculated using HEC's 1997 NexGen, Provisional Version 1. Damages with uncertainty and other parameters previously mentioned were incorporated into an @RISK spreadsheet for an estimate of insurance subsidy losses with uncertainty.

Buyout of the 39 residential structures damaged by the 20 percent annual exceedence probability flood event produced the greatest net excess benefits and a positive BCR.

During the social impact assessment and public involvement activities, several homeowners asked to be included in the buyout plan. Some of these homes were located outside the 20 percent annual exceedence flood plain but within the 12.5 percent annual exceedence probability flood plain and adjacent to a targeted structure. One of these homes was deemed economically feasible for buyout.

Lessons Learned

- 1) The FIA floodplain regulations work. The structure inventory deep within the floodplain, where all the big benefits are to be derived, is depreciating as it slowly deteriorates. Justification of structural alternatives is virtually impossible given this situation.
- 2) The analytical approach for a nonstructural solution is very different from that used for a structural solution. Data regarding individual properties is necessarily more stringent in its requirement for accuracy.
- 3) The necessity for a mandatory buyout in order to guarantee the government's return on investment is a continuing issue for discussion.
- 4) The timeframe for implementation of a nonstructural buyout should be abbreviated so that the targeted homeowners forego short-term considerations such as what occurred when flooding affected the targeted homes in the fall of 1998 after the homeowners had been informed of the government's intent to purchase their properties. In the interim, the local sponsor has come forward with a plan to pre-purchase the properties prior to reauthorization and Federal funding and then ask for reimbursement from the Corps. (Actually, HQUSACE is taking the tactic that the buyout is a "separable element" so that reauthorization will not be required).
- 5) Never underestimate the general public's interest in golf course development.
POC: Carol Halloway, (409) 766-3126

CONCURRENT AFTERNOON SESSION FLOOD DATA COLLECTION (1)

**SESSION ORGANIZER
TIM KUHN, CENWP-PM-FE**

1300-1345

**FLOOD DAMAGE DATA
COLLECTION PROGRAM**

STUART DAVIS, IWR-R

Mr. Davis presented his methods and progress in developing generic structure/contents depth-damages relationships. Damage functions are being developed based on structural characteristics, contents, cleanup costs, and non-physical damages/costs. Steps in the data-gathering and analysis process were reviewed. Case-study areas (completed and pending) serving as the basis for post-flood data collection (i.e., Grand Forks, ND) were described. Hard-copy depth-damage functions for six residential structural types were distributed. It was also discussed that residential content damage is difficult (unpopular with flood victims) survey information to gather.

Stuart Davis discussed the IWR Flood Damage Data Collection Program, which has four primary elements. First, to create reliable flood damage relationships. Second, to base the relationships on type of flooding (e.g. velocity, duration) and architecture. Third, to estimate nonphysical flood damage costs. Fourth, to create tools for flood damage analysis, such that the findings can be readily applied. Case Study research has been coordinated with several districts that have received recent flooding, with the initial focus being residential damages. Some preliminary results were shown, with a draft report expected in late June. Content losses are based on structure value, rather than content values. Additionally, damages prevented due to warning time are being analyzed.

Mr. Davis also presented information concerning the impact of emergency actions taken by flood victims. Flood warning lead-time effect, types of actions, and content damages prevented (structural content and automobile removal) by emergency measures was reviewed. Damages prevented by warning time exceeded \$1,000 per structure exclusive of vehicles. Interestingly, it was noted that preliminary investigations indicate non-structural damages related to cleanup (e.g. unpaid labor) could exceed 6% of total damages.

POC: Stuart Davis, (703) 428-7086

1345--1500	DEPTH-DAMAGE MODELING DEMONSTATION	JIM HINES PASCAL LORTHOIR MARSHALL & SWIFT, INC.
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Representatives of Marshall and Swift, Inc. presented two computer programs that can be used for property valuation, and flood damages respectively. One program is the Residential Estimator which given building data entered by the economist, a structure value will be estimated. Many elements to the program are built-in but can be overridden by the user (e.g. depreciation). The second program is designed to estimate damages by water depth. Given a specific structure type and depth of water, structure and content damages are estimated, identifying the damaged components. The damages are based on replacement cost, not depreciated replacement. Standard deviations or other statistical probabilities have not been developed at this time. The program does not differentiate by type of flooding or duration. Marshall and Swift and IWR are investigating methods to coordinate their work and make it usable for the field.

POC: Stuart Davis, (703) 428-7086

1530-1730	PANEL DISCUSSION – THE ECONOMIST, DO WE STILL MATTER?	DR. JIM JOHNSON, CECW-P BOB DANIEL, CECW-PIG GARY HERSHDORFER, CENAD-ET-P JOHN BOGUE, CESP-ET-P
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Mr. Harry Kitch chaired the Panel discussion and presented the results of the questionnaire participants filled out at the start of the conference. The results follow:

The first question asked participants about the degree of involvement economist in their respective districts or divisions have in environmental restoration studies.

Highly Involved	12% (5)
Involved	17% (7)
Somewhat Involved	21% (9)
Slightly involved	31% (13)
Not Involved	19% (8)

The second question asked participants the degree project analysis has improved since initiation of the new project management regulation.

Great Improvement	0% (0)
Some Improvement	3% (1)
Limited Improvement	23% (9)
No Improvement	59% (24)
Worsened Analysis	15% (6)

The third question asked participants to describe Corps of Engineers economic guidance.

Confusing	40% (17)
Too Detailed	2% (1)
Irrelevant	7% (3)
Adequate	37% (16)
Good	14% (6)

The fourth question asked the participants to rate the importance of different project customers on a scale of 1 to 5. 5 being most important, 1 being least important.

Populace Affected

<u>Importance</u>		<u>Value</u>
Least Important	(1)	10% (6)
	(2)	17% (7)
	(3)	12% (5)
	(4)	37% (15)
Most Important	(5)	24% (10)

Taxpayers

<u>Importance</u>		<u>Value</u>
Least Important	(1)	14% (6)
	(2)	21% (7)
	(3)	10% (5)
	(4)	21% (15)

Most Important (5) 33% (10)

Other Stakeholders

<u>Importance</u>		<u>Value</u>
Least Important	(1)	12% (5)
	(2)	31% (13)
	(3)	29% (12)
	(4)	19% (8)
Most Important	(5)	10% (4)

Project Management

<u>Importance</u>		<u>Value</u>
Least Important	(1)	49% (21)
	(2)	14% (6)
	(3)	14% (6)
	(4)	9% (4)
Most Important	(5)	14% (6)

Panel members then made short presentation describing their view of the role of economists in the organization. The consensus of the group was that economist of a vital cog in the Corps team. Economist must continue to insert themselves into the decision-making process throughout the business areas and organizations of the Corps. The presentations were followed by a lengthy question and answer session covering a variety of topics.

PowerPoint Presentation of question responses available at ***

LESSONS LEARNED / RECOMMENDATIONS FOR NEXT WORKSHOP:

Gathering feedback from participants: In order to gather feedback for both lessons learned and to provide recommendations for the next workshop, conference participants were asked to respond to the following questions:

1. Which presentations were particularly beneficial?
2. What did you think of the facilities?
3. Please provide can comments or suggestions for the next conference.

Conference participants universally praised the conference in general and several presentations in particular. Overall the facilities were considered acceptable to good; however, there were some complaints, which underscore the importance of knowing exactly what non-per diem costs will be borne by conference participants. Additionally, several excellent suggestions were provided which are detailed below.

LESSONS LEARNED / RECOMMENDATIONS:

Understand all Costs to Participants: The particular issue is noted because of warranted complaints about the cost of making long distance calls from the hotel. The hotel charged a \$2.85 long-distance fee, plus an 80% surcharge for the first minute, then operator-assisted rates. In one instance, a conference participant making 12 very short calls was charged almost \$80 dollars (he was eventually credited half the amount after complaining). We would suggest that before booking a hotel, conference organizers asked about long distance charges, parking costs; or any other incidental charges that might apply.

Summaries of Presentations: The Economic conference used “scribes” to develop synopses of presentations for inclusion in this report. This resulted in some delays in developing the report and inconsistencies in the amount of detail individual scribes went into in preparing their synopses. At future economic workshops we will ask presenters to prepare a 2-3 paragraph summary of their presentation which will be provided to the scribe before hand. The scribe will then simply add to the summary to reflect individual details they feel are important and to document any questions and answers during the presentation.

Nametags: The conference organizer neglected to make arrangement for nametags before the conference. At the conference, stick-on nametags were provided. We would suggest that the purchase of reusable nametags is a warranted expense.

Introductions: Due to a tight conference schedule, there was not enough time to allow a session where participants introduced themselves and their interests. The schedule was partially driven by the amount of material that needed to be presented given this was the first economic conference in seven years. Still, a session on introductions would have been useful in fostering communication one of the goals of the workshop.

Field Trip: Again due to the tight schedule no time was available for a field trip. This was unfortunate given field trips provide an opportunity to break up some otherwise continual classroom sessions.