

2005 WATERSHED SUMMIT: LESSONS LEARNED TRANSFERRING SCIENCE TO WATERSHED MANAGEMENT

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THE Charlotte Harbor National Estuary Program (CHNEP) hosted a Watershed Summit on February 15–17, 2005 to highlight the latest research which has implications for management decisions. Our theme was Lessons Learned in Transferring Science to Watershed Management. The research falls into the broad categories outlined in the CHNEP Comprehensive Conservation and Management Plan (CCMP): fish and wildlife habitat, water quality, and hydrology.

The Charlotte Harbor Watershed Summit is an important step in the CHNEP process of bringing public and private stakeholders together to discuss ongoing studies and critical environmental issues facing the region. The Summit held in 2005 was an opportunity to review progress since the first Watershed Summit held in 2002 and to discuss current and emerging issues and research affecting the Charlotte Harbor watershed. CHNEP also held a symposium/conference in 1997.

CHNEP is one of 28 National Estuary Programs (NEPs) which focus on estuarine and watershed health; all were created pursuant to section 320 of the Clean Water Act. CHNEP is among the youngest of the NEPs and one of four in Florida. The CHNEP study area covers 4,400 square miles, seven counties, and eight distinct watersheds.

We have found that the major management characteristics that affect this program are:

- A Variety of Regional Partnerships
- Outstanding Research Efforts
- Ability to Communicate Findings across geographic, institutional, and professional boundaries
- Interest of decision-makers to use the best available science
- Committed citizens and professionals.

The CHNEP approach to management decisions is not that science leads to resulting management decisions but that science forms a foundation on which to base management decisions. For example, research can include status, trends, geographic distribution of resources and effects, variability, direct impacts, models, environmental indicators, and complex interactions. Findings from these increasingly complex studies paint broad pictures for decision-makers. Decision-makers are faced with accepting or rejecting standard practices, issuing public information, funding restoration alternatives, and adopting legislation and regulations. General principles and findings are invaluable to these choices.

In that spirit, the Summit was arranged from a management perspective. The Summit themes were:

- Identifying Potential Environmental Issues
- Transferring Findings to Management
- Using Indicators to Improve Management
- Accounting for Variability in Nature
- Applying Findings to Models.

The decision-making process is driven by identifying potential issues and analyzing alternatives, solutions, and costs. Through the alternatives evaluation process research findings are most important to decision-makers.

Indicators are important to communicate the effects of current management practices to both citizens and decision-makers. Designing and implementing appropriate indicators is both a science and an art. For National Estuary Programs, using indicators to improve management is a basic aspect.

Presentations discussing the impacts of the 2004 hurricane season on Charlotte Harbor and its watersheds could seemingly fall outside the realm of the central theme. However, Charlotte Harbor is a variable system with inter-annual changes in water quality, river flows, and seagrass coverage. A specific session was dedicated to natural variability and the difficulty that arises in determining conclusive research results and, in turn, management programs.

These topics generally reflect a number of steps used in resource management but are not inclusive. For instance, sessions dedicated to designing and maintaining a monitoring or research program to respond to specific management questions or methods of analyzing results are not addressed.

Identifying potential environmental issues—The process of identifying environmental issues in the first place is the first critical step. It is a basic tenant of the environmental planning process. Without the identification of possible issues in the first place, no management changes can be effected. The approach to identifying potential issues can be taken at two scales: identification of broad patterns that can be used to focus attention where warranted and research on specific concerns that are not captured sufficiently in broader approaches.

Broad sweeping issues identification such as the US EPA Coastal Conditions Report and the Conservancy of Southwest Florida's Estuaries Report Card are critical as a first cut to understanding potential issues. These types of reports are useful to providing citizens and decision-makers information on severity and extent of problems which must be addressed. In addition, it provides information on management decisions which have yielded benefits to the environment.

Surveys of the public are useful to obtain user perspectives. The general public is a source of information on conditions on the ground and concerns which decision-makers need to address. Surveys of human impact such as changes in seagrass scarring are used by the CHNEP to inform management decisions.

Ecoestrogens and pesticides are difficult and expensive to assess but methods are needed to determine if waterways are being contaminated. Inexpensive methods

to identify potential issues presented at the Summit included using a benthic invertebrate calibration to assess watersheds and using optical brighteners to determine sources of fecal coliform in the environment.

Transferring monitoring and research results to management—Monitoring is a long term investment if it is to be useful. It is difficult for decision-makers to make long term funding commitments to monitoring; however, monitoring is critical to understanding long-term trends.

Water quality measurements in the CHNEP study area is a multi-agency effort. Partners have made efforts to share data to have more robust results. One of the more remarkable programs is the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network (CHEVWQMN). Water quality data are collected by trained citizen volunteers who are able to collect samples concurrently, so that single and comparative snapshot of water quality can be gathered. These data are combined with agency data to determine water quality impairments under state rule. Total Maximum Daily Loads (TMDLs) and Basin Management Action Plans (BMAPs) are in turn developed. The ability to single out chronic water quality impairments is tremendously useful for restoration planning, stormwater design, and better standards.

The invasion of exotic pest plants and nuisance exotic animals warrants monitoring. Surveying the effects of invasive exotic animals on wetland functions, the relationship of habitat quality on nonnative fish colonization, and the identification of newly identified exotic species, such as the Nile monitor lizard, in the area are all critical to management decisions. For example, highlighting the problem of the Nile monitor lizard in Cape Coral prepared the City of Sanibel to program funding for eradication within days of the first confirmed identification of the Nile monitor lizard on the island city.

The USGS has monitored water flows within the study area since the 1930's. Since then more streams have been monitored by water management districts and other agencies. The information has been invaluable in understanding historic water flows and establishing Minimum Flows and Levels (MFLs) pursuant to state regulation.

Use of environmental indicators to monitor and improve management—Broadening monitoring efforts, both geographically and by scale, increases the effectiveness of original effort. For example, the water management districts have mapped seagrass coverage regularly to evaluate change. The Charlotte Harbor Aquatic Preserve Program increased the value of the original program by collecting transect data to evaluate species composition, epiphytic relationships over time, and depth. By having a better understanding of these very complex relationships in select areas, better management decisions can be made with the context of the overall mapping effort.

The Frog Listening Network was started in the Tampa Bay region. The methods of citizen training and monitoring were applied in southwest Florida through the program Frog Watch.

Various bioindicators are being investigated in the CHNEP study area. Observing the condition of various animal species can highlight the impacts of

complex, inter-linked changes in water quality, hydrology, and habitat. Sharks, red mangrove crabs, spotted seatrout, and sawfish were investigated.

Accounting for variability in nature—Variability in nature is a confounding aspect of relating findings to citizens and elected officials. Often the exception to the rule can stymie efforts to improve management. Exceptional events such as the impacts of Hurricane Charlie changed and accelerated identified trends. Some of these changes could be predicted. Drastic drops in oxygen changed faunal assemblages in the northern Charlotte Harbor estuary.

Applying monitoring and research results to models as a tool for better management—Properly calibrated mathematical models can represent the possible impacts of proposed management decisions. Modeling the environment is difficult but advances are being made. The Everglades Restoration efforts have advanced the development of models in southwest Florida, particularly for effects of management decisions on blue crabs, oysters, and slough systems.

Development of hydrodynamic models of the estuaries has long been an ambitious goal of the CHNEP. Advances are being made by linking the estuaries with the Gulf of Mexico circulation models, improving bathymetric mapping, and integrating water quality parameters into the models.

Availability of Geographic Information Systems (GIS) and relational databases is improving an overall vision for restoration strategies in the CHNEP study area and beyond. The Lee County Master Mitigation Plan has synthesized the knowledge of resource managers working in Lee County. This work has been used for the CHNEP Restoration Plan, Southwest Florida Feasibility Study, and Everglades Restoration. The Southwest Florida Water Management District expanded this work to support their own restoration efforts. Because of the GIS and relational database formats, matching restoration needs with mitigation funding and grant funding requirements becomes easier.

The future—CHNEP has committed to host a Watershed Summit every three years. The information that is summarized by our partners at these conferences is utilized in our own decision-making process. These decisions include selection of format and content for public outreach, selection of needed research projects to support future decisions, choice of restoration projects, and recommendations for legislation and rules. The representatives on our various committees take information that we have developed or summarized back to their own organizations. In this way, knowledge grows and decisions are improved.

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