An Eye Opening Approach to Integrated Environmental Assessments

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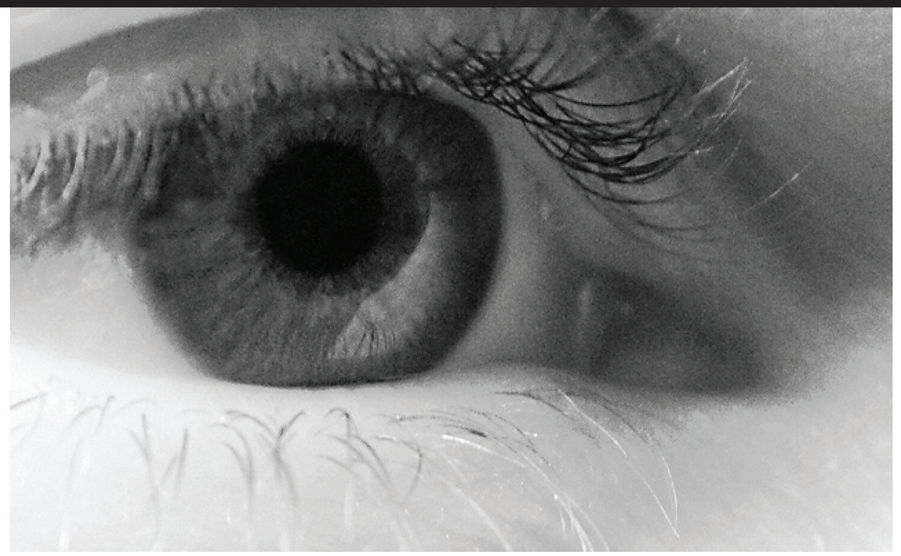
ABSTRACT Environmental management is not practiced in a vacuum. Effective stewardship of natural resources requires the adoption of multiple objectives set forth by diverse groups of stakeholders with varied perspectives and interests. Within this management landscape, integrated environmental assessments provide a useful framework for evaluating resources and directing management efforts. The integrated assessment process involves a) initial scoping, b) conceptual ecological modeling, c) data navigation, d) environmental report cards, and e) science communication. Each step of this process requires the synthesis and visualization of information on the spatially explicit status and trends of multiple natural resources. We provide a case study using examples in mid-Atlantic region national parks in which visual elements (conceptual diagrams, maps, graphs, tables, and photographs) facilitate these activities and provide an eye opening approach to more effective environmental decision-making.

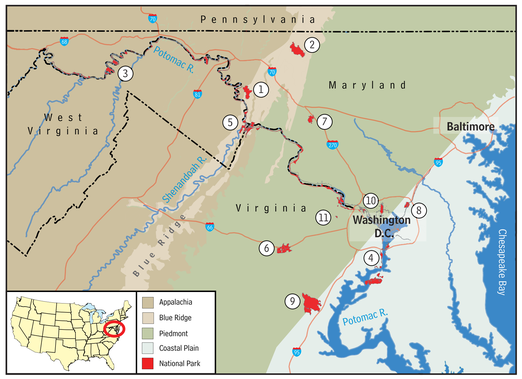
IN A NUTSHELL

- The integrated assessment process iteratively distills multivariate data and multiple objectives creating common ground for divergent stakeholders
- The multi-phase process is at least as important as the final products
- Visual elements provide an intuitive framework for summarizing, accessing, and communicating quantitative information
- Conceptual diagrams ('thought drawings') are powerful tools that link key ecosystem features, environmental indicators, and major threats



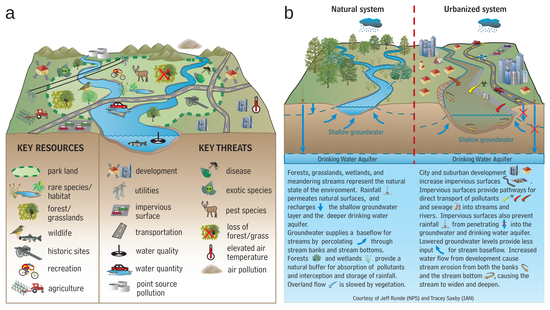
1. *INITIAL SCOPING*

Locations of the National Parks (red) in the National Capital Region used in the integrated environmental assessment process: 1. Antietam National Battlefield, 2. Catoctin Mountain Park, 3. Chesapeake and Ohio Canal National Historic Park, 4. George Washington Memorial Parkway, 5. Harpers Ferry National Historic Park, 6. Manassas National Battlefield, 7. Monocacy National Battlefield, 8. National Capital Parks-East, 9. Prince William Forest Park, 10. Rock Creek Park, and 11. Wolf Trap National Park for the Performing Arts.



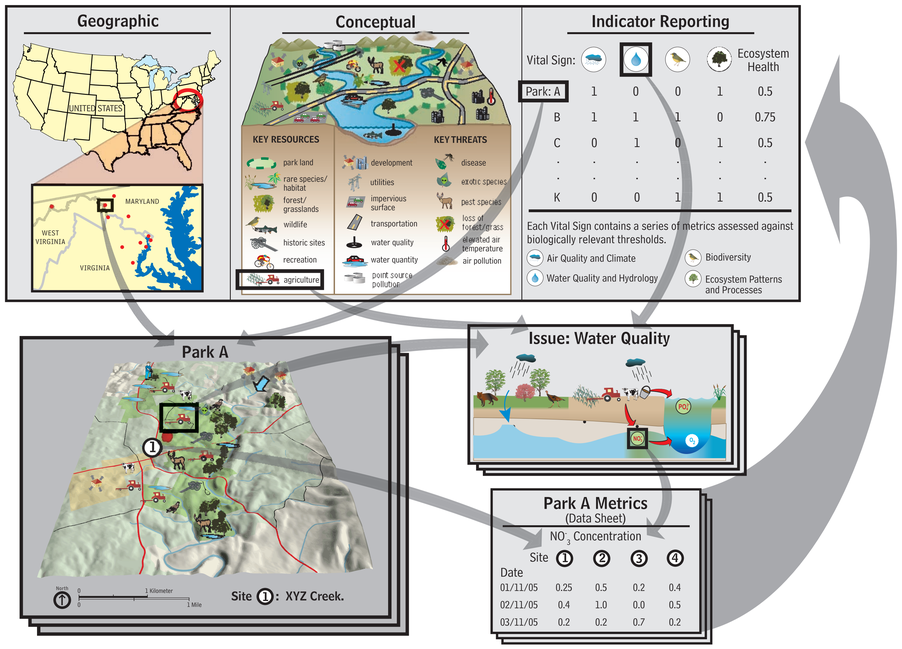
2. *CONCEPTUAL ENVIRONMENTAL MODELING*

Generalized National Park conceptual diagrams: a) highlighting key resources and major threats and b) detailing changes in stream processes with urbanization.



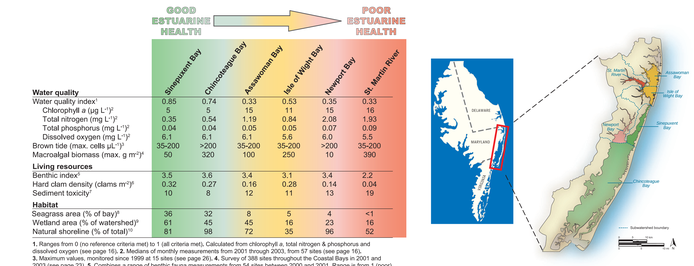
3. *DATA NAVIGATION*

Data navigation framework used to disseminate environmental data. Environmental indicators, which are measured and put into a data base, can be accessed via three routes: geographic (place-based), conceptual (theme-based), and/or indicator (attribute-based). The geographic route uses an overall map linked to individual park maps. The conceptual route uses an overall conceptual diagram linked to ecological vignettes. The indicator route uses a hierarchal series of general to specific indicators.



4. *ENVIRONMENTAL REPORT CARDS*

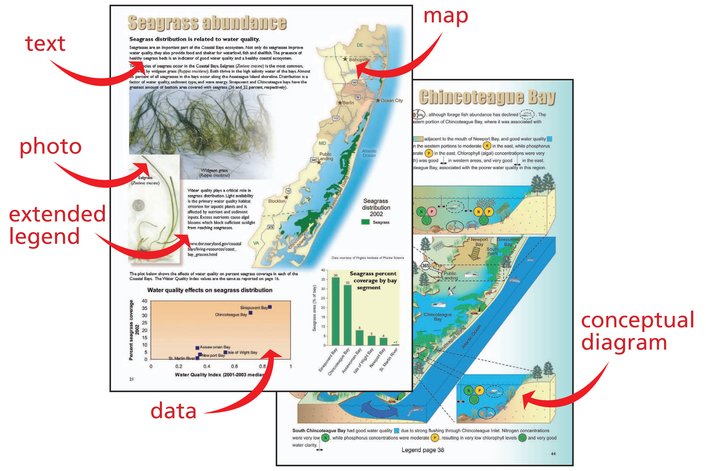
An environmental report card developed for the Assateague National Seashore region in which water quality, living resource, and habitat indicators are used to rank the sub-watersheds of the coastal embayments behind the barrier islands. Modified from Wazniak *et al*. 2004, *State of the Maryland Coastal Bays* report, www.ian.umces.edu/reports/.



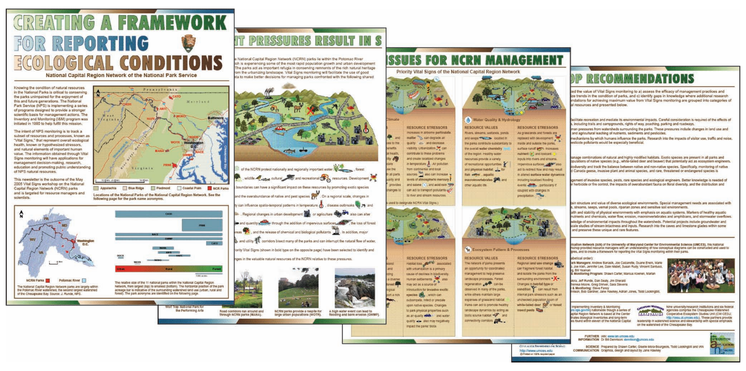
1. Ranges from 0 (no reference criteria met) to 1 (all criteria met). Calculated from chlorophyll *a*, total nitrogen & phosphorus and dissolved oxygen (see page 16). **2.** Medians of monthly measurements from 2001 through 2003, from 57 sites (see page 16). **3.** Maximum values, monitored since 1999 at 15 sites (see page 26). **4.** Survey of 388 sites throughout the Coastal Bays in 2001 and 2003 (see page 23). **5.** Combines a range of benthic fauna measurements from 54 sites between 2000 and 2001. Range is from 1 (poor) to 5 (good) (see page 32). **6.** Averages from 1994-2000 from a total of 1499 sites (see page 33). **7.** Apparent Effect Threshold- combines critical levels of a range of toxicants, measured between 1991-1996 from > 800 sites (see page 36). **8.** 2002 aerial photographic survey (see page 21). **9.** Survey carried out in 1988 and 1989 (see page 28).**10.** Aerial photographic survey carried out in 1989 (see page 27).

5. *SCIENCE COMMUNICATION*

An illustration of visual elements of science communication for the Assateague National Seashore region in which a map of water quality index is combined with photographs, data graphs and conceptual diagrams.



This newsletter is the outcome of a May 2005 Vital Signs workshop on the National Capital Region Network parks. A PDF of this newsletter can be found at www.ian.umces.edu/newsletters/.



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