

Guana Tolomato Matanzas National Estuarine Research Reserve

*Preserving Public Lands to
Sustain Healthy Communities*



A binding principle



*Equally as basic
as it is complex*



A photograph of a forest scene. In the foreground, a bird is perched on a branch, facing left. The bird has a yellowish-green body and a dark cap. The background is a dense forest of tall, thin trees with green foliage. The lighting is bright, suggesting a sunny day.

Ecosystem Services

“Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life.”

~Daily, G. (ed.), 1997, *Nature's Services: Societal Dependence on Natural Ecosystems*. Island Press, Washington D.C.

Provisioning Services

Goods regenerated, produced,
or provided by ecosystems

- Water Supply
- Food
- Raw Materials
- Genetic Resources
- Medicinal Resources
- Ornamental Resources

Modulating, Supporting, and Stabilization Services

- Climate Stabilization
- Disturbance Mitigation
- Pest and Disease Control
- Pollination and Seed Dispersal
- Water Purification
- Soil Retention
- Waste Treatment
- Nutrient Cycling
- Biodiversity

Cultural Services

Non-material benefits obtained
from ecosystems

- Recreation
- Aesthetics
- Science and Education
- Spiritual and Historic

This proposal appeared in the 2010 MoMA Rising Currents exhibition, a collaboration between ARO and DLANDSTUDIO. (ARO & DLANDSTUDIO)





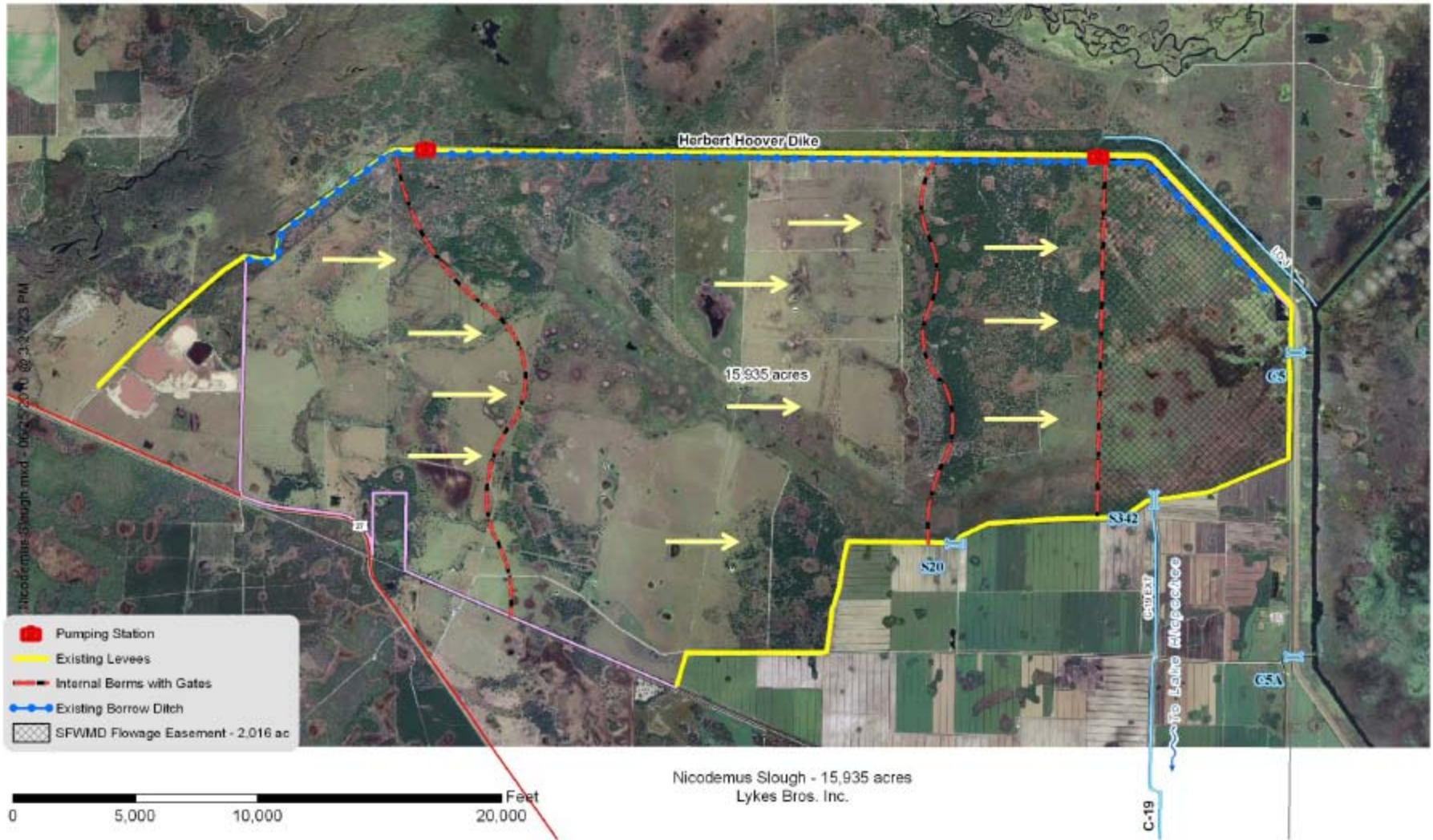
The Catskill/Delaware system, covering 1,600 miles, remains unfiltered, making it the largest unfiltered water supply in the US.

Share of forested watershed	Treatment costs per 3,000 m3	Average annual treatment costs	Cost increase over 60% forest cover
60%	\$29	\$297,110	
50%	\$36	\$369,380	24%
40%	\$46	\$465,740	57%
30%	\$58	\$586,190	97%
20%	\$74	\$746,790	151%
10%	\$91	\$923,450	211%

Percent forest cover and predicted water treatment costs based on 27 US water supply system, based on treatment of 22 million gallons per day, the average daily production of water suppliers surveyed. For more information, see *Postel, Sandra L. and Barton H. Thompson. 2005. Watershed protection: capturing the benefits of nature's water supply services. Natural Resources Forum. Issue 29, Pp 98-108.*



Conceptual Design Results



Project Benefits

- **Approximately 34,000 acre feet of regional water storage over approx. 16,000 acres**
- **Substantial P load reduction**
(West Waterhole Pasture 2,500 acres 3.3 M tons in 11 weeks)
- **Reduce harmful estuary discharges**
- **Unique waterbody connections allows for significant management flexibility**
(Fisheating Creek, Lake Okeechobee, C-19 to Caloosahatchee River)
- **Potential dry season, treated water supply to Caloosahatchee Estuary or Lake**
- **Benefits realized early**

- Approximately 60% (15 out of 24) of the ecosystem services evaluated by the **Millennium Assessment** were considered degraded or used unsustainably.
- The degradation of ecosystem services often causes significant harm to human well-being and represents a loss of a natural asset or wealth of a country.
- In five-years (2004-2009), coastal wetlands experienced a decline of 110,000 acres roughly the size of 84,000 football fields. This rate of loss far surpasses that of all other wetland habitat types.

"Status and Trends of Wetlands in the Conterminous United States, 2004-2009," a report released by the United States Fish & Wildlife Service (USFWS), represents the most up-to-date, scientifically valid assessment of the nation's wetland habitats.

Estuaries & Watersheds

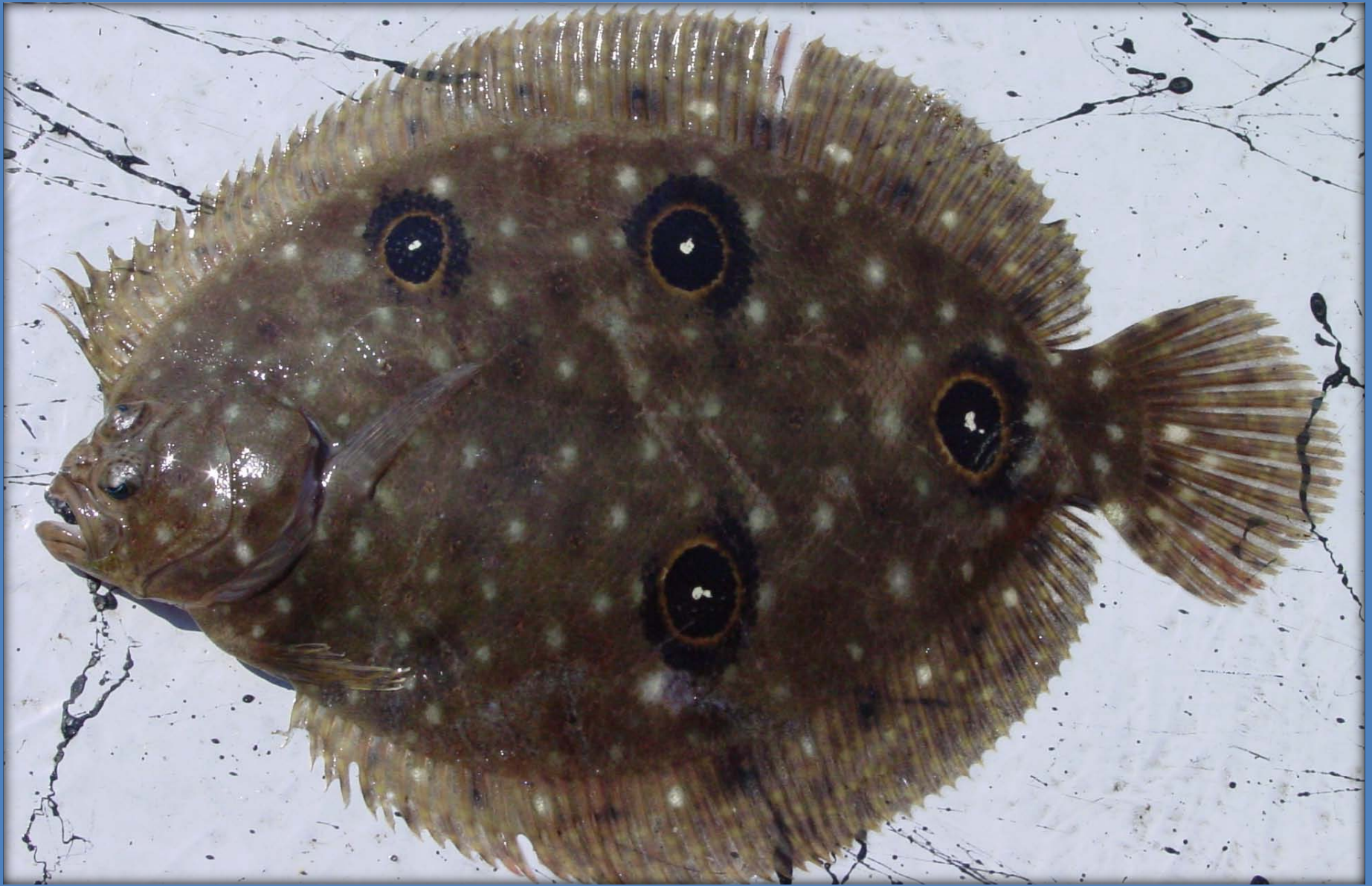




Natural Buffers

Filtration





Supports 75% of all fish and shellfish harvested

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Tourism & Recreation

Research Challenges/Opportunities

- **Linkages of ecosystem services with human well being:** How do people directly or indirectly benefit from nature?
- **Systematic and standardized data collection for carefully selected indicators:** What are the local trends and thresholds in ecosystem condition and their services?
- **Valuation of ecosystem services:** How “valuable” are ecosystem services in comparison with other tradeoffs?
- **Social/Political Science:** Generating the political will to incorporate ecosystem services into local and regional planning decisions.



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