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Photo A.1: Weaver Bottoms Constructed 1986 Swan & Mallard Island, Whitewater River



Mallard Island

Swan Island

Whitewater River sediment plume after
a large rainfall event



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Photo A.2: Weaver Bottoms Hydraulic dredging of fine sediments into a containment cell constructed on Swan Island





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Photo A.3: Weaver Bottoms Fine sediments (ie. topsoil) being spread over sand on Mallard Island





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Photo A.4: Weaver Bottoms Groins on north side of Swan Island





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Photo A.5: Weaver Bottoms Offshore rock mound, Swan Island





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Photo A.6: Weaver Bottoms Mallard Island Shoreline



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Photo A.7: Weaver Bottoms Swan Island Groin



Deposition

Erosion

Predominant wind

South winds dominate littoral drift on this shoreline causing deposition on the south side of this groin and erosion on the north side

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Photo A.8: Weaver Bottoms Swan Island biotechnical stabilization



Wooden stakes with wire strung between them were initially used to anchor the fiber rolls, however wave action soon loosened many of the stakes. The USFWS came up with a simple and effective way to hold the fiber rolls down.
Sandbags.



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Photo A.9: Weaver Bottoms Prairie Grasses on Swan Island





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Photo B.1: Lake Onalaska Constructed 1989 Sheltered zone downstream of islands

Black River Plume

An aerial photograph of Lake Onalaska, showing three islands. A yellow arrow points from the text 'Black River Plume' to a dark, turbid area in the upper right portion of the lake, representing the sediment plume. The islands are surrounded by a lighter, clearer water zone, indicating sheltered areas.

Heavy rainfall, followed by sediment laden tributary inputs elevated Mississippi River sediment concentrations on this day. Each of the three islands has a zone of influence where clearer water persists.



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Photo B.2: Lake Onalaska Comorant Island before topsoil





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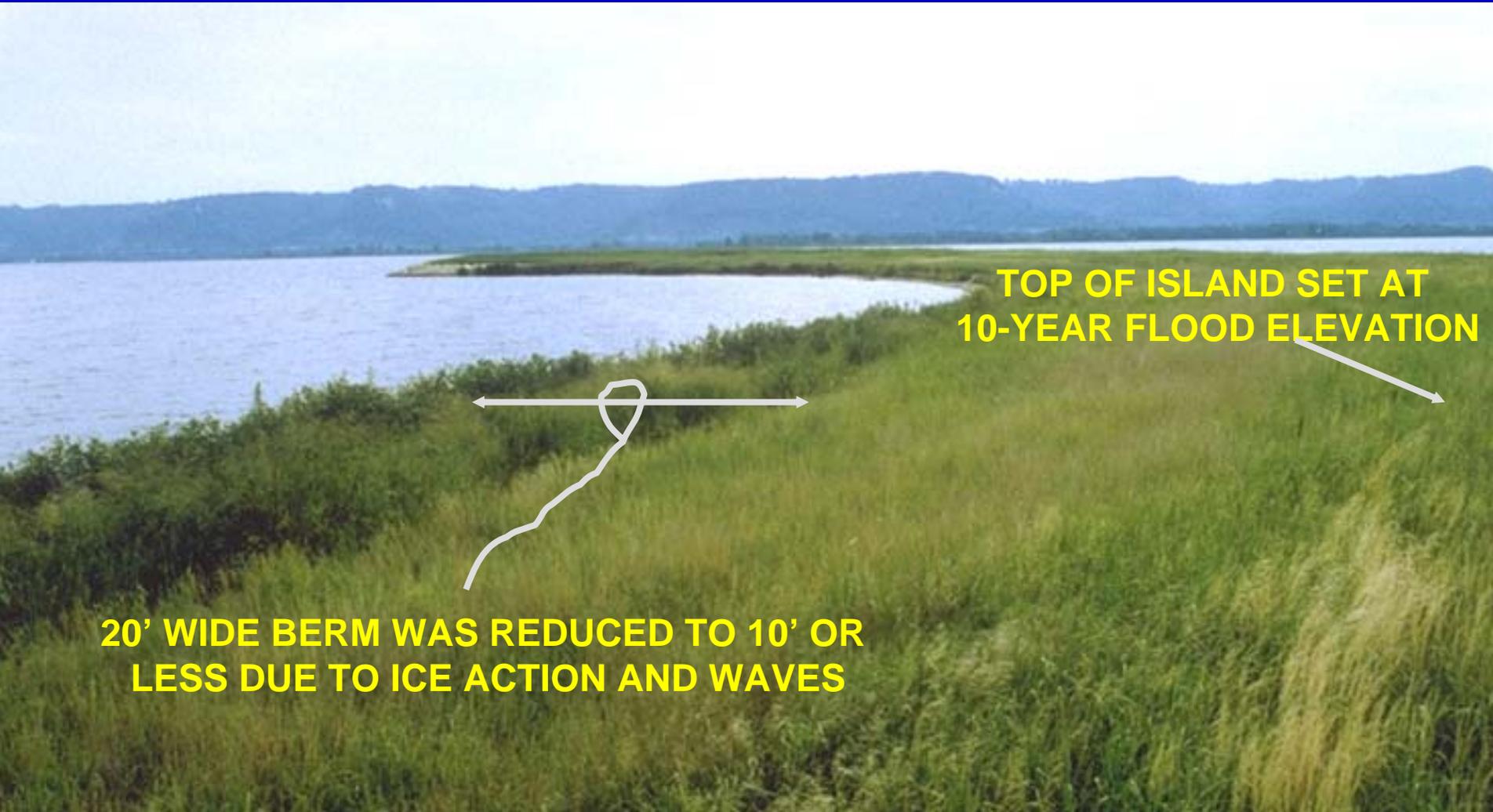
Photo B.3: Lake Onalaska Comorant Island before vegetation





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Photo B.4: Lake Onalaska Broken Gun Island 1989



TOP OF ISLAND SET AT
10-YEAR FLOOD ELEVATION

20' WIDE BERM WAS REDUCED TO 10' OR
LESS DUE TO ICE ACTION AND WAVES



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Photo B.5: Lake Onalaska Riprap and Geotextile





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Photo B.6: Lake Onalaska Ice action at Broken Gun Island





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Photo B.7: Lake Onalaska Ice damaged groins



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Photo C.1: Pool 8, Phase I, Stage I Constructed 1989 Horseshoe Island





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Photo C.2: Pool 8, Phase I, Stage I Horseshoe Island stable shoreline





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Photo C.3: Pool 8, Phase I, Stage I Willow growth on sand berm less than one year after construction





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Photo D.1: Pool 8, Phase I, Stage II Constructed 1992 Boomerang Island



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Photo D.2: Pool 8, Phase I, Stage II Constructed 1992 Grassy Island





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Photo D.3: Pool 8, Phase I, Stage II Fines placed on Sand Base





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Photo D.4: Pool 8, Phase I, Stage II Boomerang Island Construction





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Photo D.5: Pool 8, Phase I, Stage II Stable during 1993 flood Note green rows of grass beneath water





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Photo D.6: Pool 8, Phase I, Stage II Vegetative stabilization on Boomerang Island





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Photo D.7: Pool 8, Phase I, Stage II Erosion at Boomerang Corner



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Photo D.8: Pool 8, Phase I, Stage II Sparse ground cover after 2001 flood Boomerang Corner



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Photo D.9: Pool 8, Phase I, Stage II Biotechnical stabilization consisting of groins, sand berm, and willows





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Photo D.10: Pool 8, Phase I, Stage II Boomerang Island Waterfowl use





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Photo E.1: Pool 9 Island Constructed 1995





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Photo E.2: POOL 9 ISLAND





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Photo F.1: Polander Lake, Stage 1, Island 2 Constructed 1994





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Photo G.1: Willow Island, Pool 10 Constructed 1995





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Photo G.2: Willow Island Berm



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Photo H.1: Pool 8, Phase II Constructed 1999 Stoddard Bay





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Photo H.2: Hydraulic dredging of sand





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Photo H.3: Incorporating island remnants into new shoreline





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Photo H.4: Hydraulic Placement of Fines





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Photo H.5: Rock Sill B Stoddard Bay





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Photo H.6: Rock Sill B overtopped





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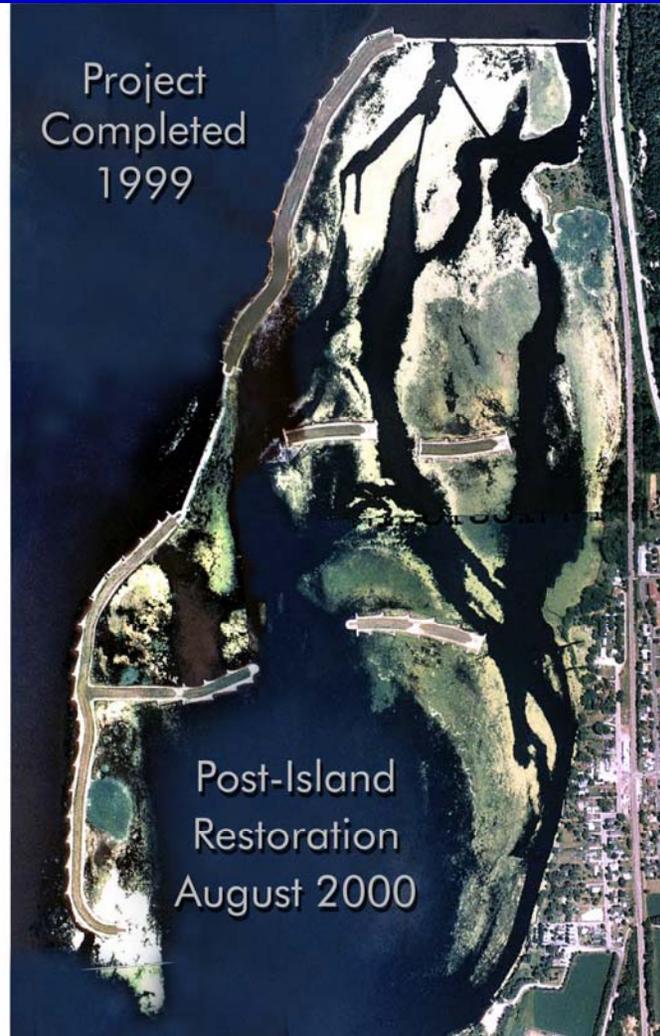
Photo H.7: Notch in Rock Sill A





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Photo H.8: Vegetative response in Stoddard Bay





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Photo H.9: Slingshot Island stable after 2001 flood



**TOP OF ISLAND SET AT
3-YEAR FLOOD ELEVATION**

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Photo H.10: Erosion of turtle nesting mound on Slingshot Island occurred during the 2001 flood



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Photo H.11: Rock Mound





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Photo H.12: Topsoil Erosion, Slingshot Island



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Photo H.13: Remnant island, Stoddard Bay





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Photo H.14: Pool 8, Phase II. Pelicans on rock seed island.





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Photo H.15: Rock Sill B



Tree growth on structure
may reduce discharge

No evidence of
scour hole formation
on downstream side
of structure.



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Photo I.1: Polander Lake Constructed 2000





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Photo I.2: Loafing structure anchored with rock



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Photo I.3: Groins





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Photo I.4: Erosion of top of island due to 2001 flood





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Photo I.5: Scalloping around groin occurred during the 2001 flood



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Photo I.6: Erosion of sand and fines occurred during the 2001 flood



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Photo I.7: Benching due to wave action during the 2001 flood



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Photo I.8: A breach formed due to overtopping during the 2001 flood.



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Photo I.9: Polander Lake shoreline





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Photo I.10: Interior wetland





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Photo I.11: Polander Lake prairie grasses





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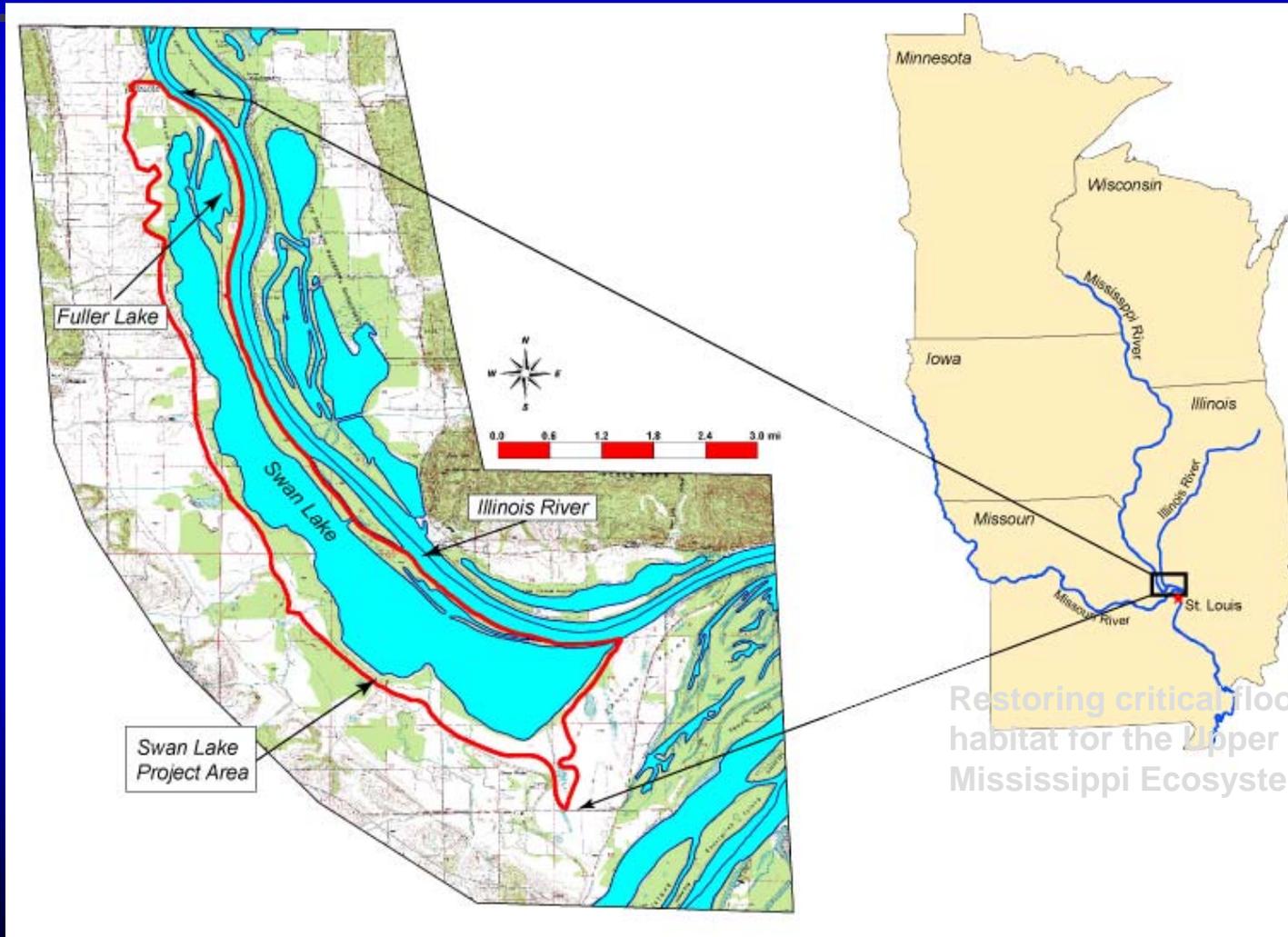
Photo I.12: Polander Lake loafing structures





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Photo J.1: Swan Lake, Illinois River Plan View

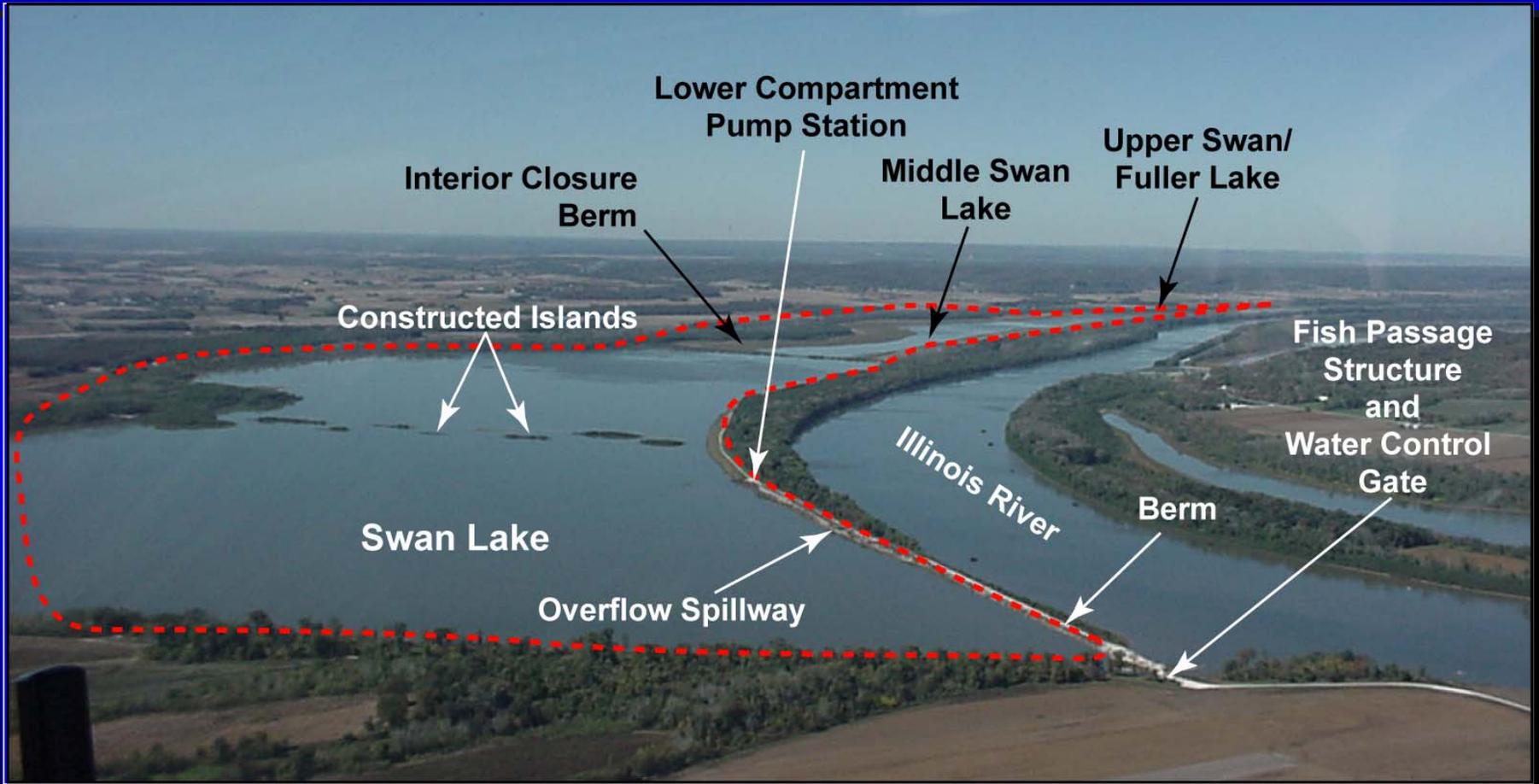


Restoring critical floodplain
habitat for the Upper
Mississippi Ecosystem



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Photo J.2: Aerial View of Swan Lake Project, Looking North





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Photo J.3: Swan Lake Islands, Illinois River





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Photo J.4: Swan Lake Islands, Illinois River





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Photo K.1: Spring Lake Islands, Pool 5





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Photo K.2: Spring Lake Islands, Pool 5





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Photo K.3: Spring Lake Islands, Pool 5, Vanes





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Photo L.1: Peroria Lake Islands, Illinois River





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Photo N.1: Pool 11 Islands, Sunfish Lake





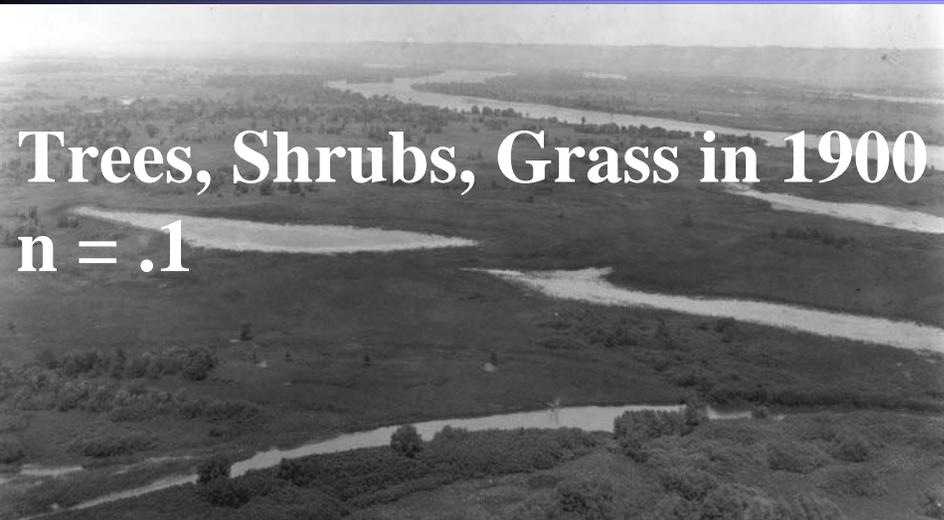
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Photo K.1: Grand Endcampment Vanes used to stabilize beach





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Trees, Shrubs, Grass in 1900
n = .1



Marsh in 1956
n = .05



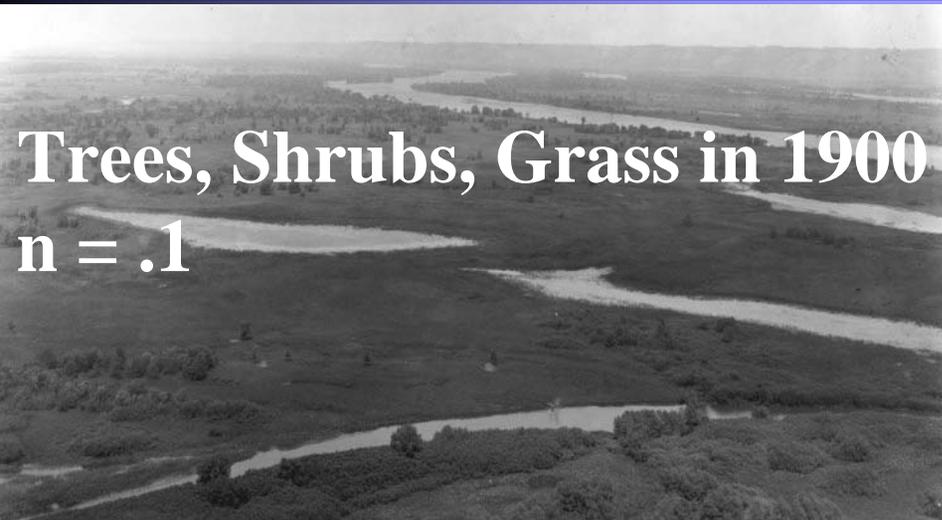
Open Water in 1992
n = .03





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Photo K.2: Weaver Bottoms. Floodplain vegetation and roughness changes.



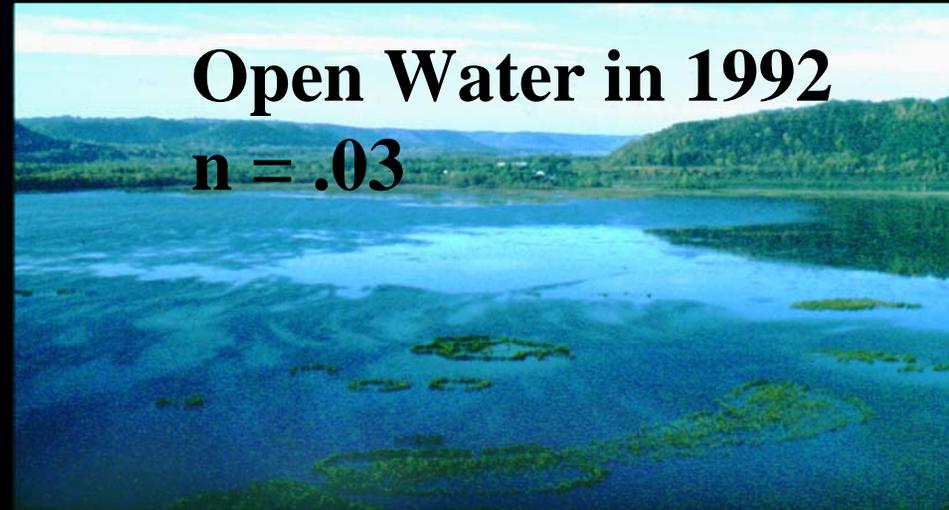
Trees, Shrubs, Grass in 1900
 $n = .1$

Physical Stresses:
Q floodplain \uparrow
Secondary Channel Erosion

Biological Effects:
Isolated Floodplain Habitat \downarrow



Marsh in 1956
 $n = .05$



Open Water in 1992
 $n = .03$



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Pool 8, Phase 3 Layout

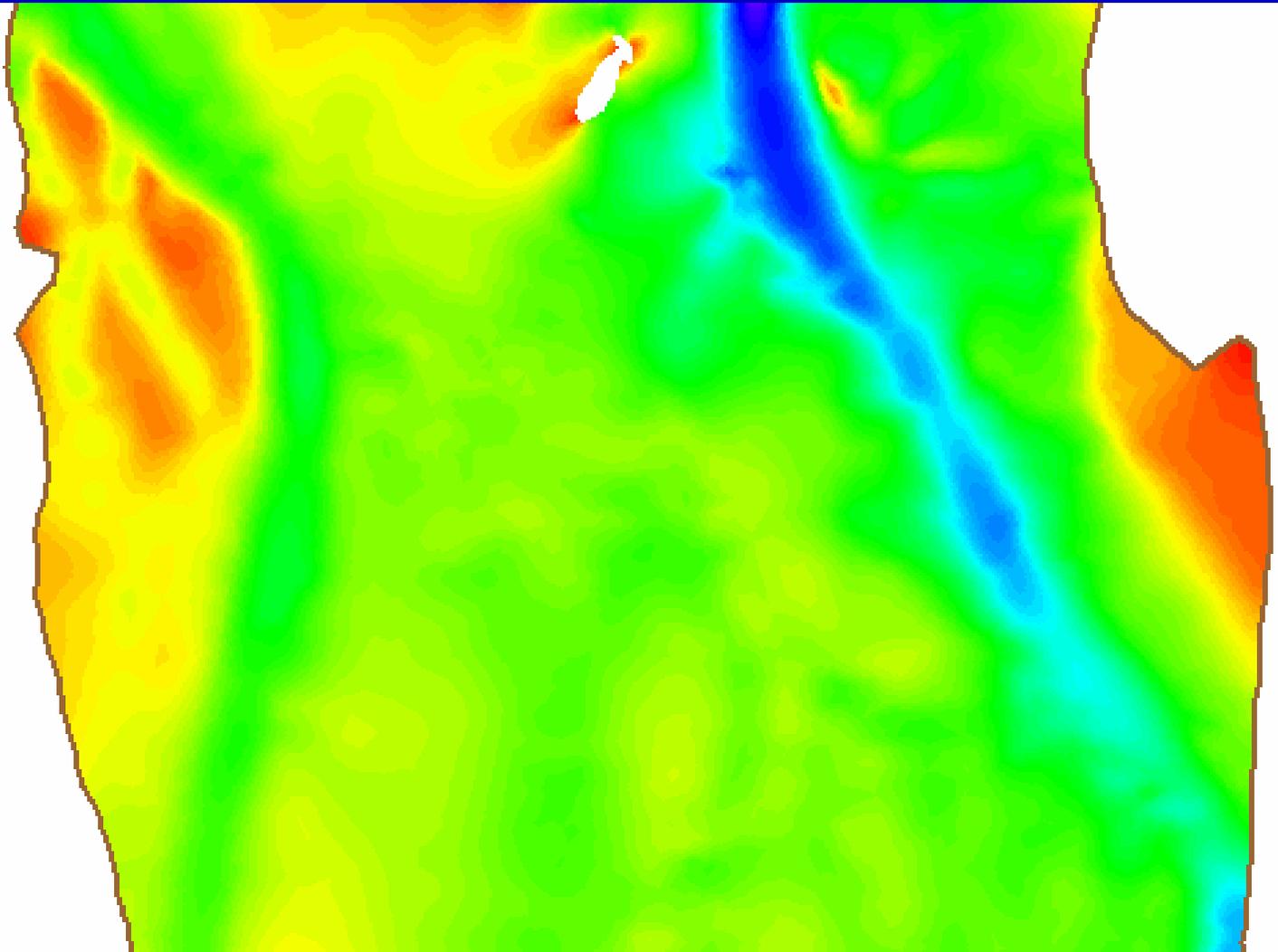
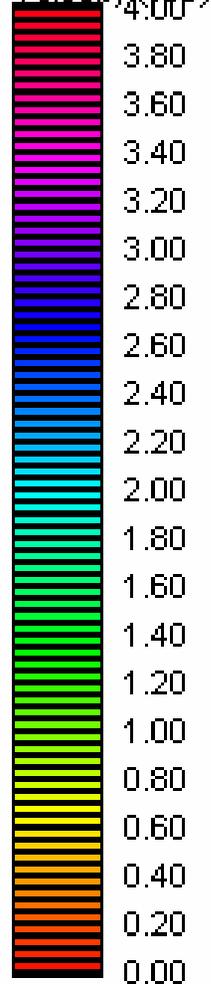




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Pool 8, Phase 3 Existing Conditions Velocity

Velocity (ft/s)

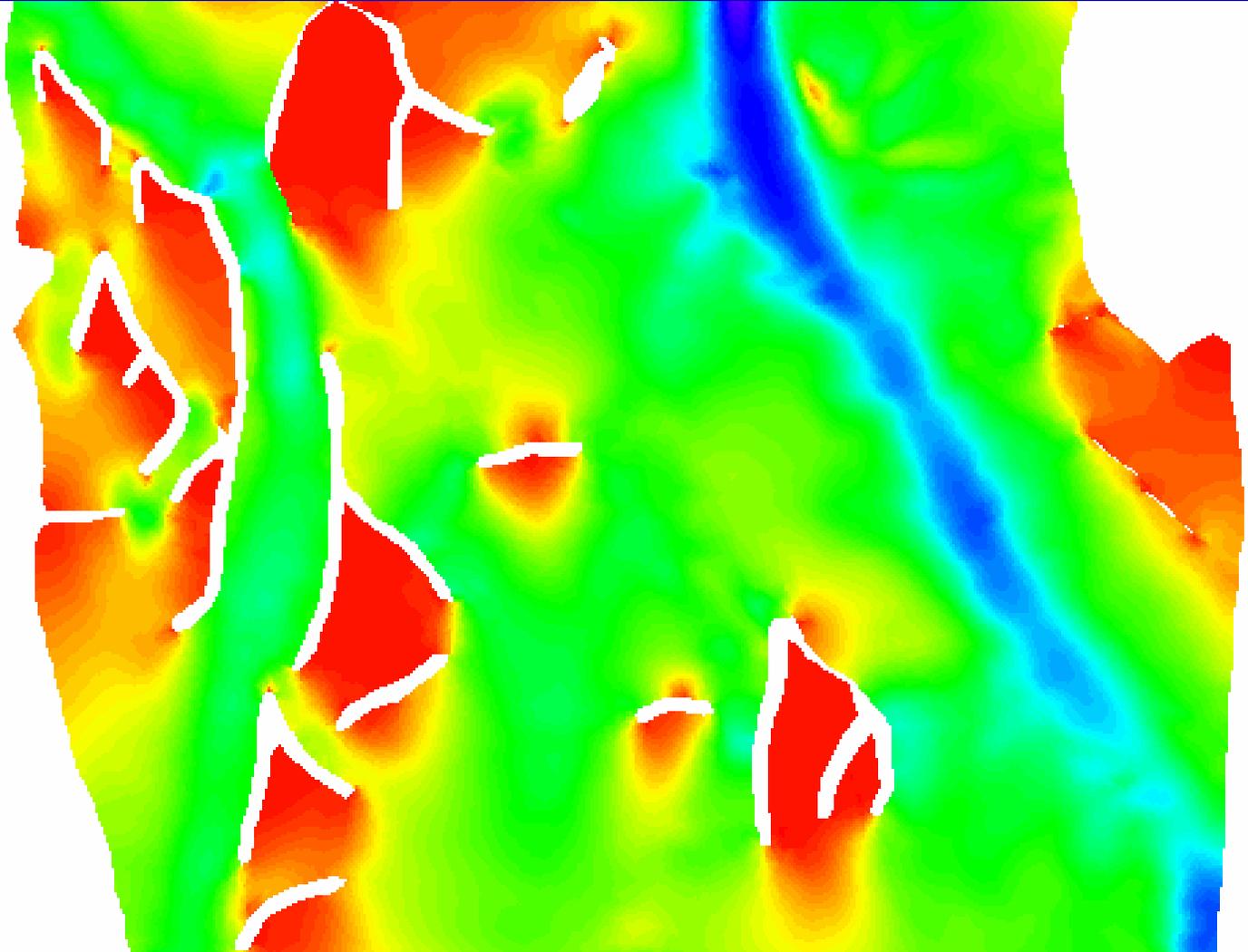
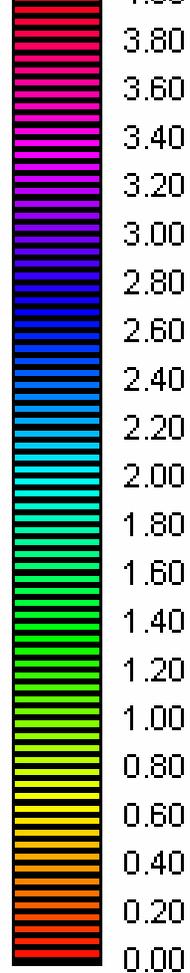




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Pool 8, Phase 3 Proposed Conditions Velocity

Velocity (ft/s)

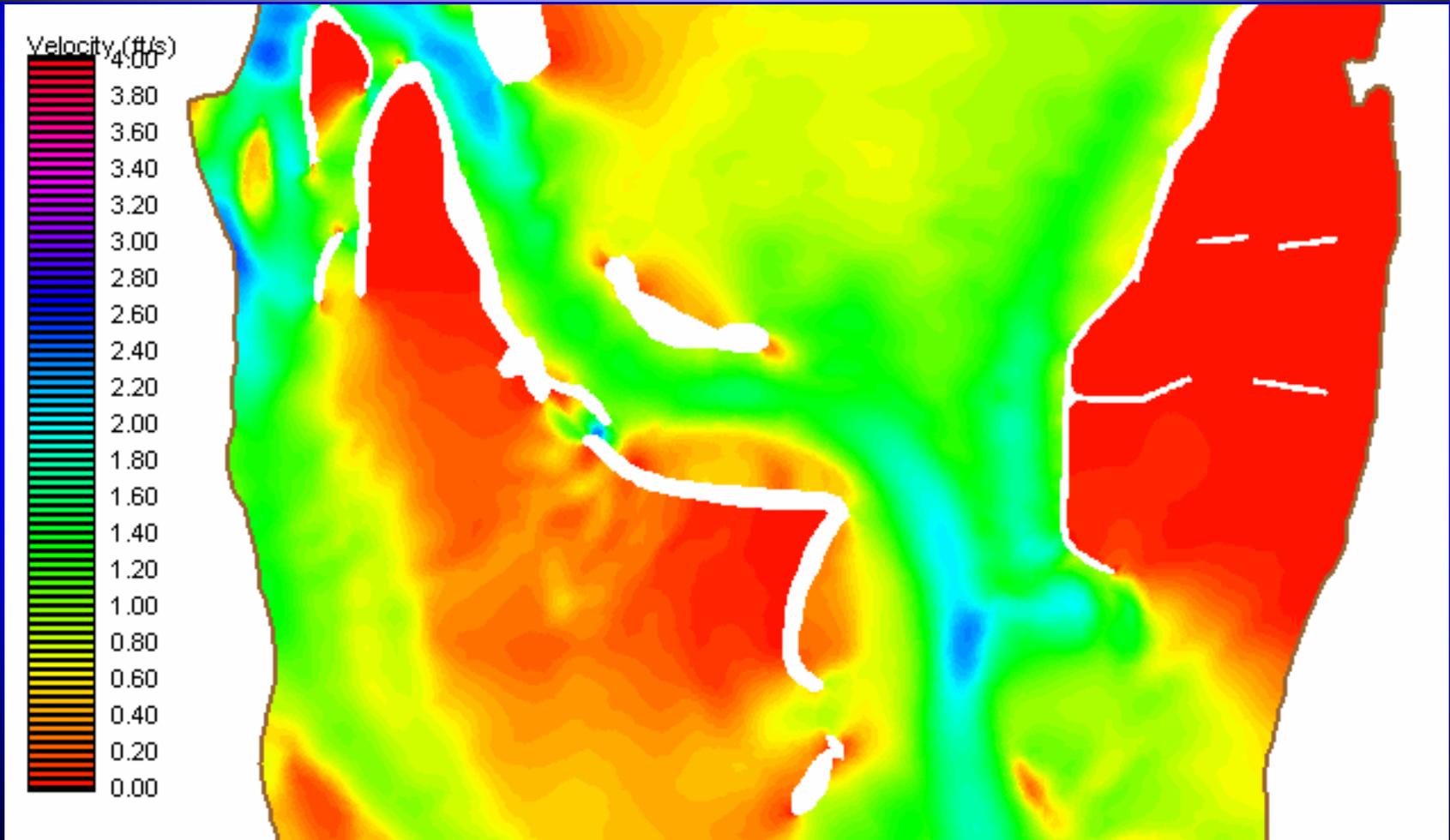




Pool 8 Existing – North Section

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Q = 50,000 cfs

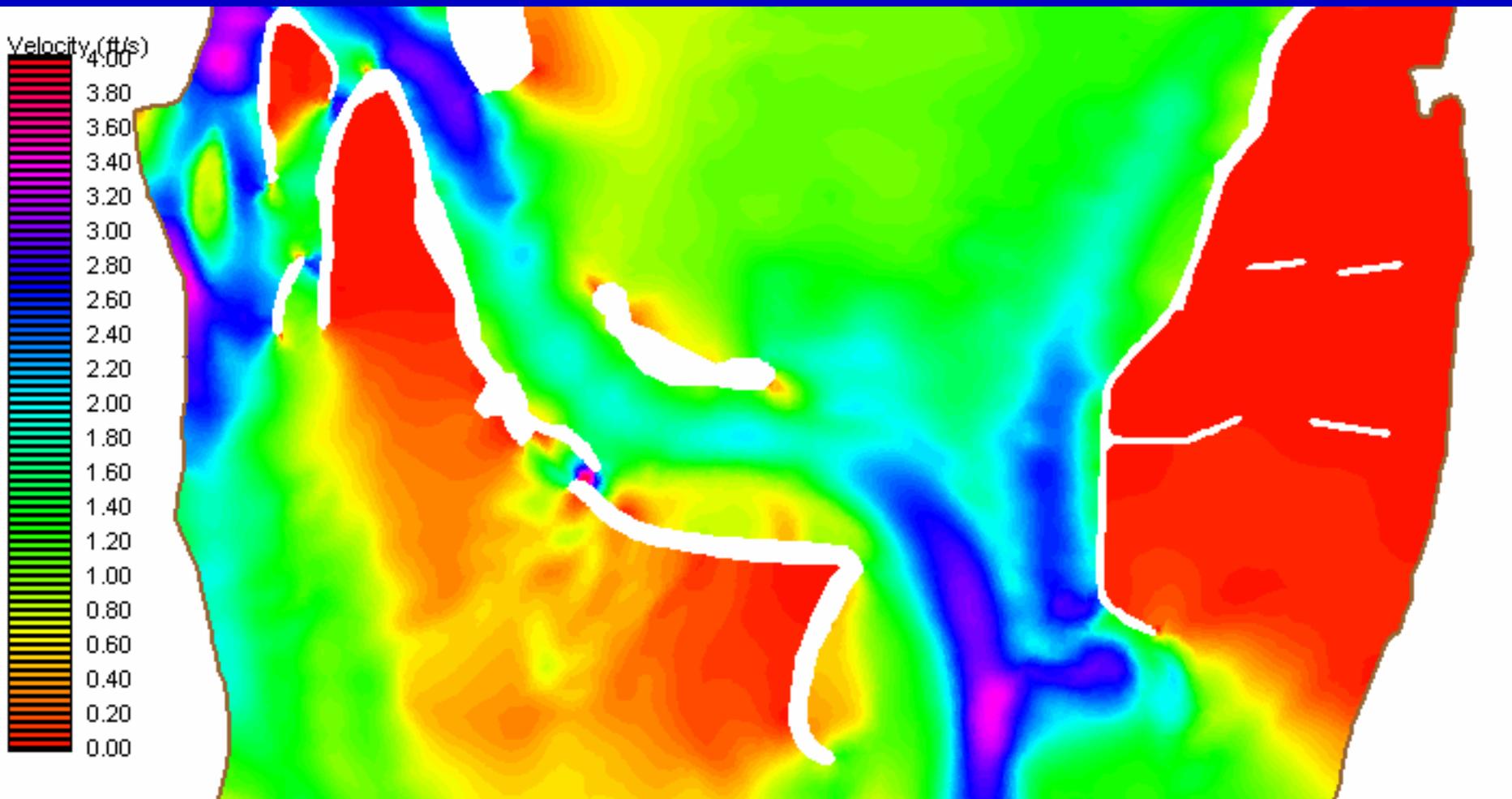




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Pool 8 Existing – North Section

$Q = 80,000$ cfs





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Red Oak Island Roots

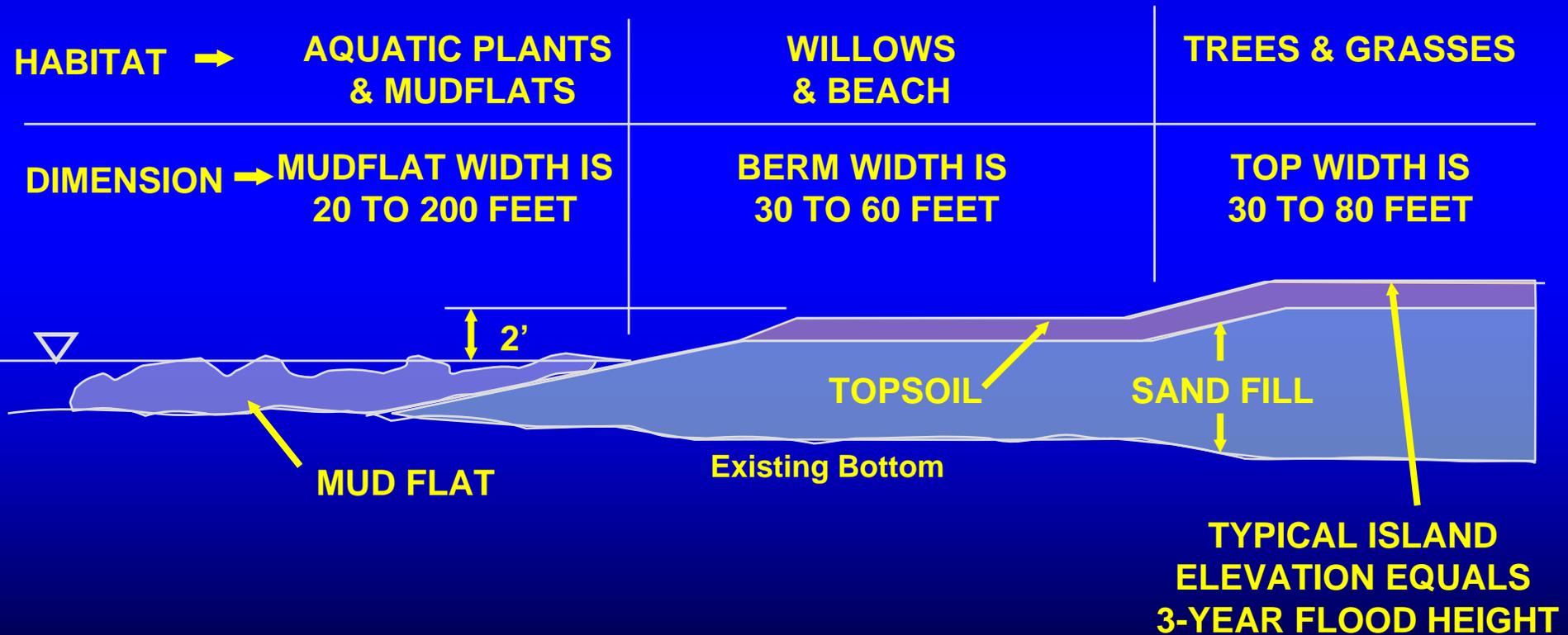


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ISLAND CROSS SECTION





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ISLAND TYPES

Tire Islands
1984



Earth Islands
1992

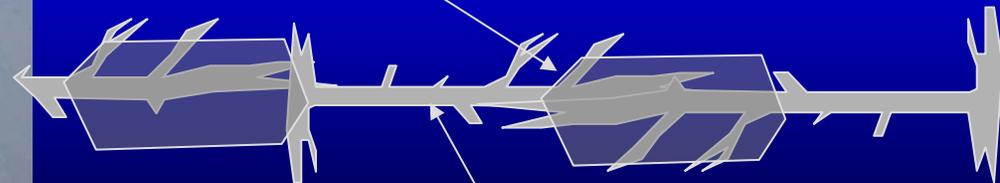


Seed Islands
1999



Rock mound with
5 foot top width

Log/Rock Islands
2004



Parallel trees anchored
in place by rock



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SHORELINE STABILIZATION





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HABITAT PROJECT DESIGN

- **Multi-discipline Teams: Project Design Must Evolve With River Sciences.**
- **Restoration Concept: Restore Form and Function to Restore Sustainable Habitat.**
- **New Projects: Based on Sound Engineering, Past Lessons, & New Creativity.**



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Lock and Dam
Construction

Driver
Stressor
Endpoint

