US Army Corps of Engineers
Waterways Experiment Station

Wetlands Research Program Technical Report WRP-DE-4

A Hydrogeomorphic Classification for Wetlands

by Mark M. Brinson

August 1993 – Final Report
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nical report ; WRP-DE-4. VI. Series: Technical report (U.S. Army Engineer Waterways Experiment Station) ; WRP-DE-4.
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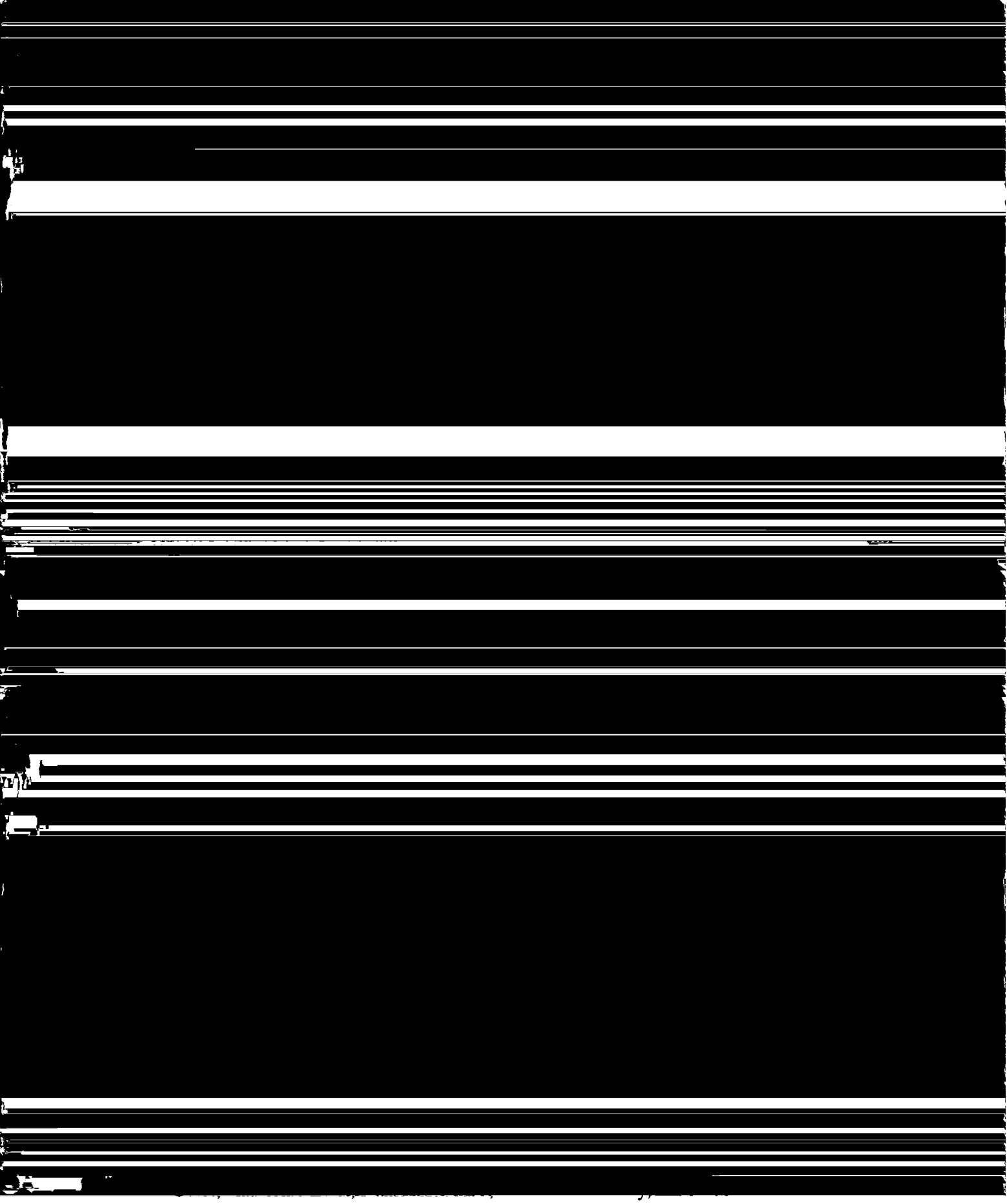

for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

gra pnic distribution of species. Species composition of plant communities,

society and are normally part of the self-sustaining properties of an ecosystem. The relationship among these properties is illustrated in Figure 1.

[redacted]

characteristics: discharge dominated, recharge dominated, and both recharge and discharge. Combinations of these types and situations are described as located within a surficial geologic setting. Hollands also provides a

physiognomy of the vegetation.

b. Groundwater depression

Figure 2. Four major hydrologic types of wetland types in Wisconsin (Continued)

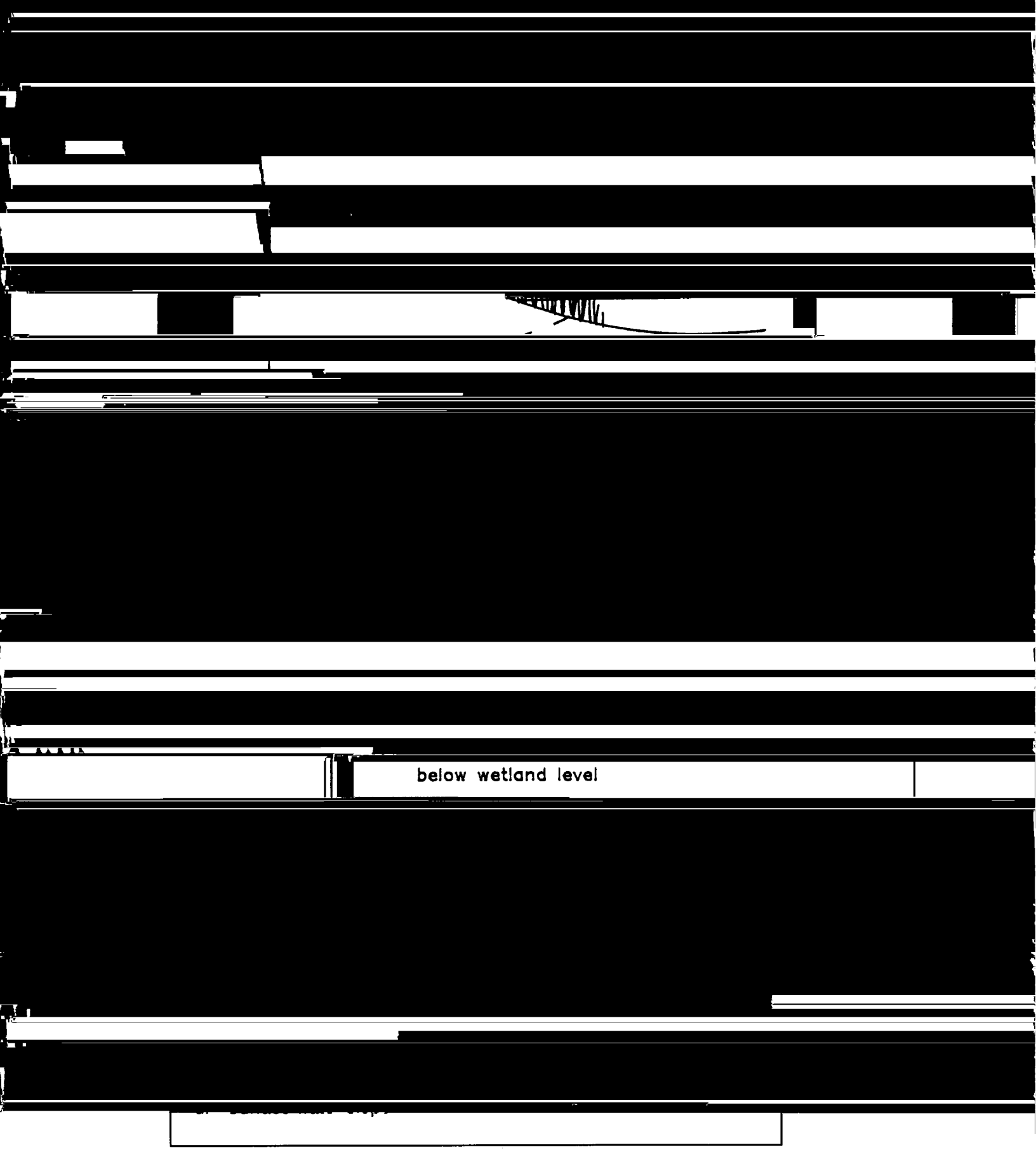

Figure 2. (Concluded)

[redacted]

of little significance in the shallow waters typical of wetlands. However,

perhaps even with the public, by focusing on processes that are fundamental to the sustained existence of these ecosystems. The other need for

resulted by subsuming two of the five types for mangroves within other

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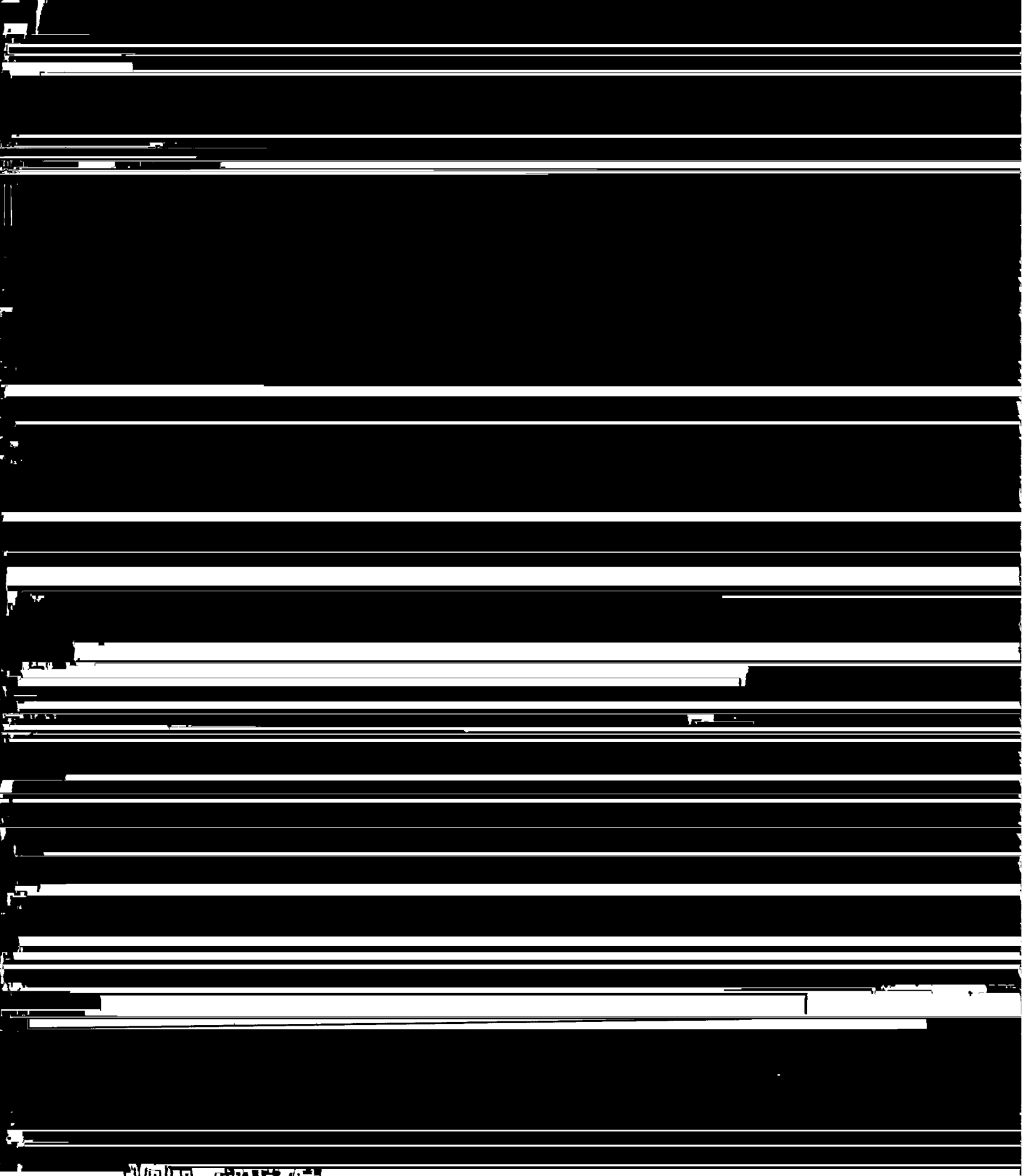


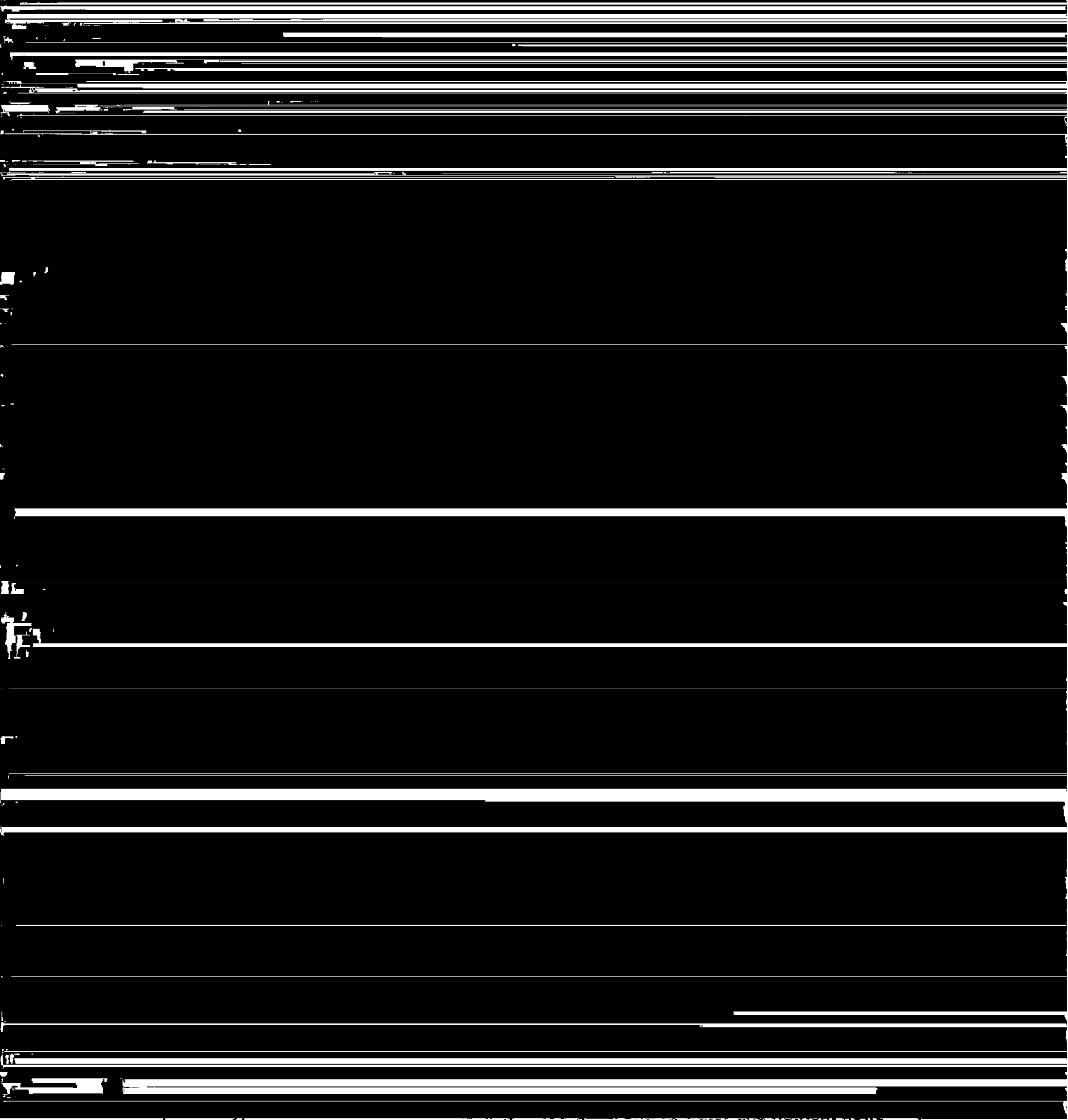


Figure 5. (Sheet 4 of 4)

succession.

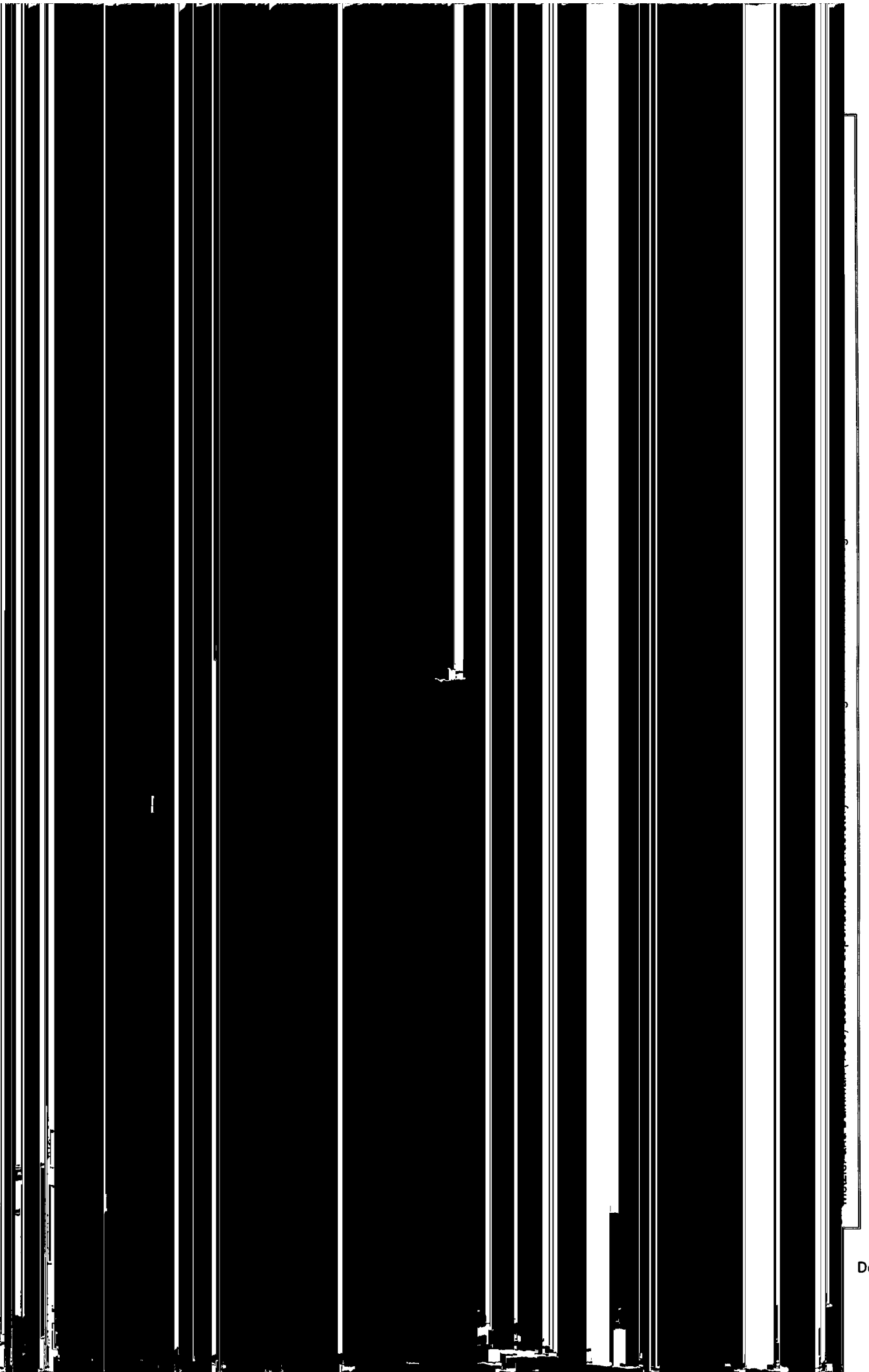
genic accretion and hydrology.

[redacted]

[4] Mechanisms for maintaining ecological significance.
[5] Other ecologically significant functions may be present; only examples are given.
[6] If wetland contains open water, waterfowl habitat may be inferred. For prairie pothole region, soil properties provide excellent indicators of hydrology (Hubbard 1988). Playa lakes of the southern High Plains reviewed by Bolen, Smith, and Schramm (1989).
[7] Zedler (1987).

[redacted]	time. Graminoid species indicative of groundwater supply.	[redacted] and thickness. Minerotrophy evident from circumneutral pH and high-ion content.	[redacted] maintains saturation to surface and hydraulic gradient to maintain flow.	[redacted] water movement without channelized flow. Moderate levels of primary production and organic matter export.

[8] Brinson (1991).



Description

[redacted]

[redacted]

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piezometric surfaces could confirm or exclude this possibility.

of water for wetlands. Adapted from Winter (1988)

floodplain wetlands are located. In high rainfall regions, woody debris and debris dams may be dominant structural channel and floodplain features

[redacted]

ited landscape may continue to have major control on drainage patterns,

tively "immature" and drainage patterns have not had time to fully develop, the relationship between surface water and groundwater is often complex.

inflows are equal to outflows.

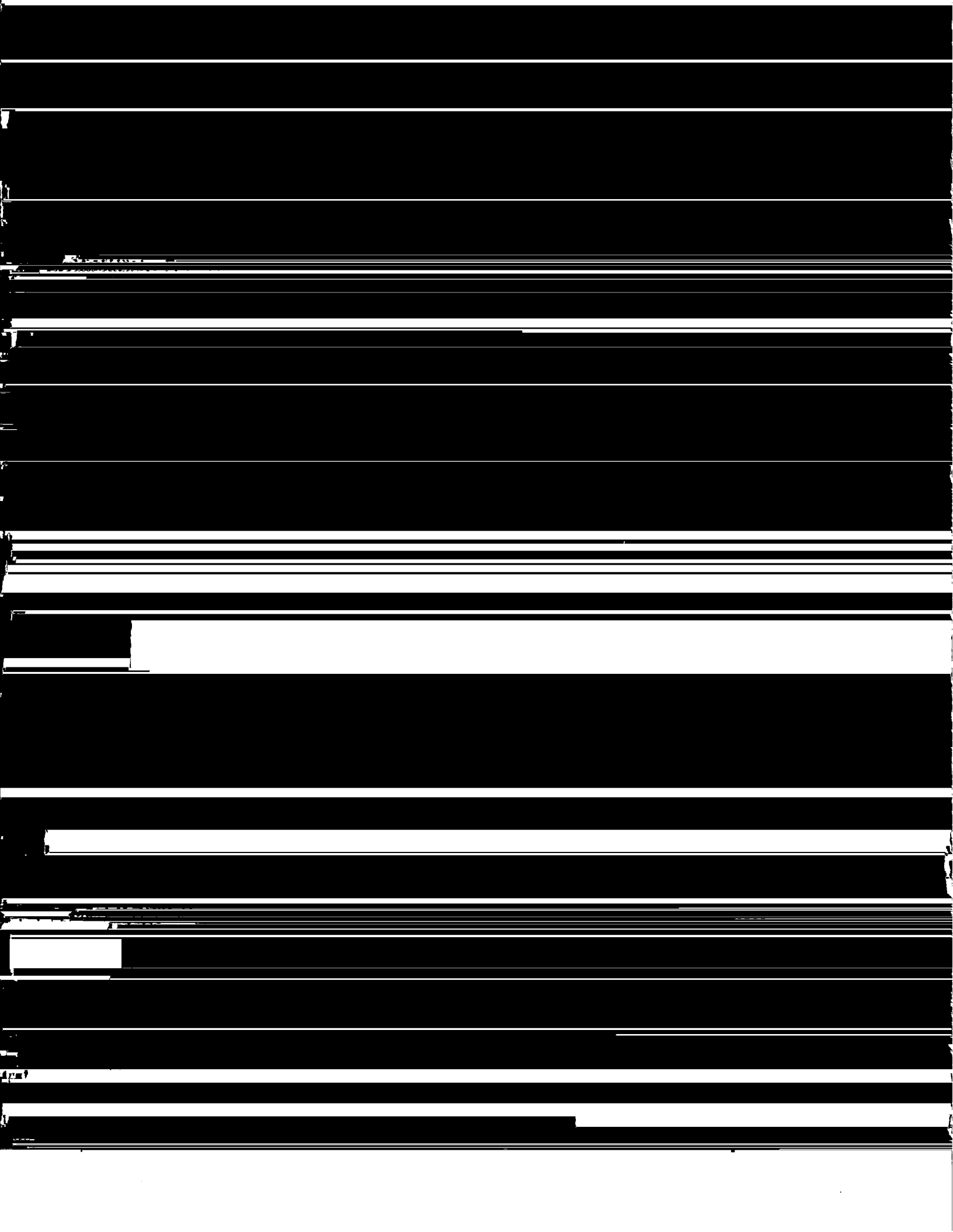
eral flows tend to be negligible in precipitation-driven wetlands except with major rainfall events when radial flow from the center may occur from raised peatlands.

[redacted]

et al. (1987)

[redacted]

[1] Personal Communication, 1991, Frank Golet, University of Rhode Island, Kingston, RI.



[redacted]

[redacted]

[redacted]

is likely required to initiate peat accumulation.

[redacted]

sources and overbank flooding.

[redacted]

metabolic pathways (Thompson 1991).

[redacted]

land site. In arid climates where drawdown can be extreme and prolonged,

[redacted]

[redacted]

(Sheet 2 of 3)

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		extreme GW drawdown/drought).		

(Sheet 3 of 3)

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have a very limited surface area. While the transport of water, nutrients,

Studies on freshwater fringe wetlands are not abundant (Prince and D'Itri 1985), especially in comparison with saltwater ones (Lugo 1990).

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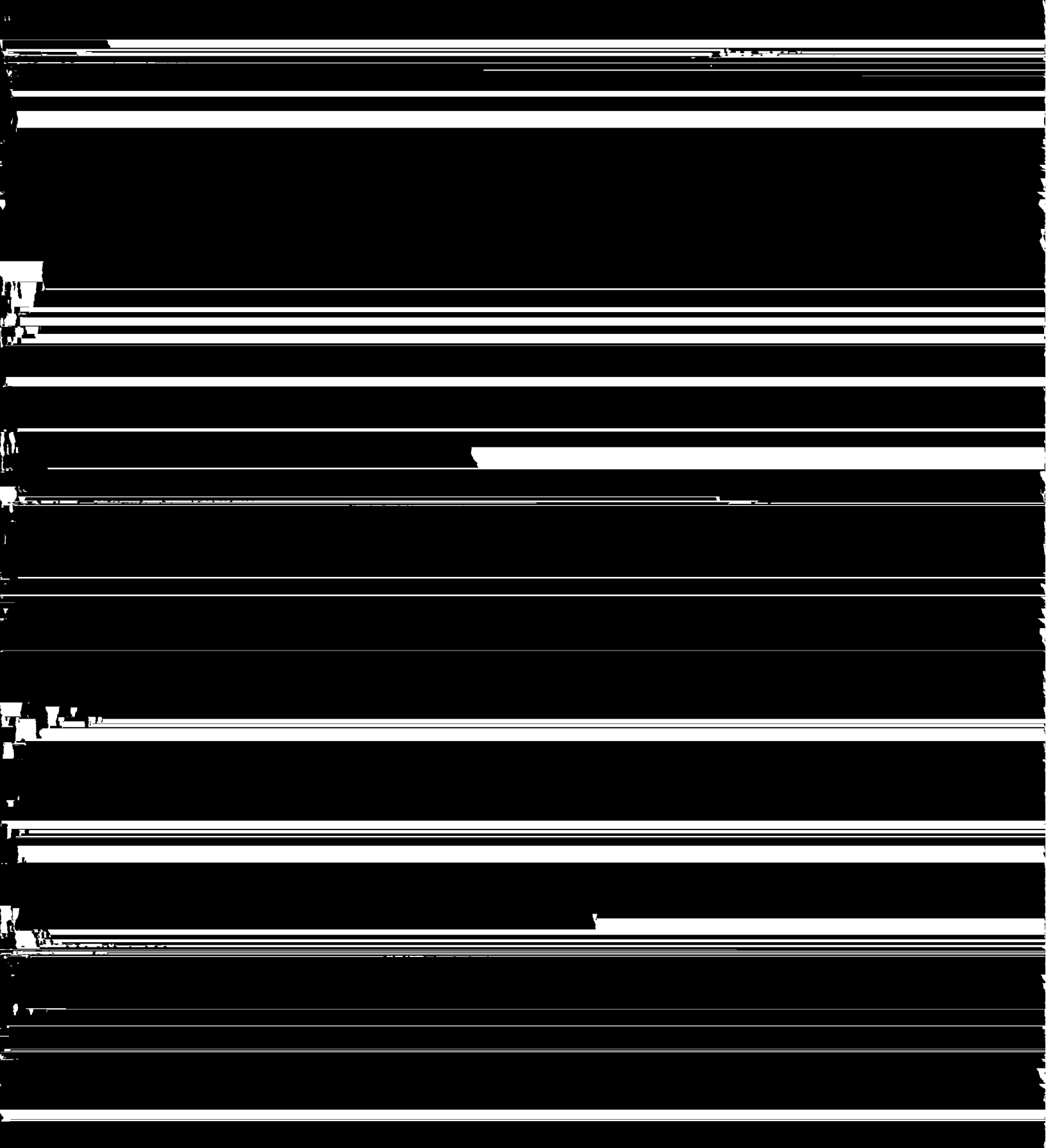

sectional profiles and direction of water flows." From Sloan (1972)

[redacted]

[2] Groundwater derived from sandy soils that are not wetlands often have high concentrations of humic and fulvic compounds as indicated by water color.

[redacted]

of these factors and availability of plant nutrients commonly correspond

number of wetland types.

Other Indicators of Functioning

Indicators have been used in other classifications. For example, the Fish and Wildlife Service classification (Cowardin et al. 1979) uses several "modifiers" of water, pH, soil material, and salinity regimes. Their usefulness for resolving wetland types is due, in part, to the fact that they are a consequence of ecosystem processes and function. Indicators have

as indicators of environmental conditions. Wetland indicator status of plants is an excellent example of this application (Tiner 1991).

wetlands being assessed in the future.

drainage because of strong coupling between landform and hydrology and to changes in climate because of climatic control of water balance.

redox levels relative to stagnant saturated soils, thus allowing the establishment of plant species that are not restricted to strongly reducing environments.

Environmental Protection Agency 404(b)(1) Guidelines (40 CFR Part 230), and several Memoranda of Agreement between the Corps and EPA.

damaged. Instead, the SNA ignores assets such as forests and soils, but further treats their destruction as an increase in income rather than a loss of wealth (Solorzano et al. 1991).

[redacted]

[1] Personal Communication, 1991, Dennis Whigham, Plant Ecologist, Smithsonian

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[redacted]

ion form (NH_4^+). Ammonia (NH_3) is a gas.

[redacted]

Bottomland—General term that refers to floodplain wetlands.

erosion by lateral migration of the channel.

nels are poorly defined such that overbank flow is quickly exceeded with minor increases in discharge.

Flow, groundwater—Water that flows below the land surface through a porous medium normally under saturated conditions.

centration. Water from calcareous aquifers is often hard because of the calcium carbonate content. Such waters are very resistant to fluctuations in pH.

[redacted]

Inundation—The condition of water occurring above the surface, i.e., flooding.

[redacted]

[redacted]

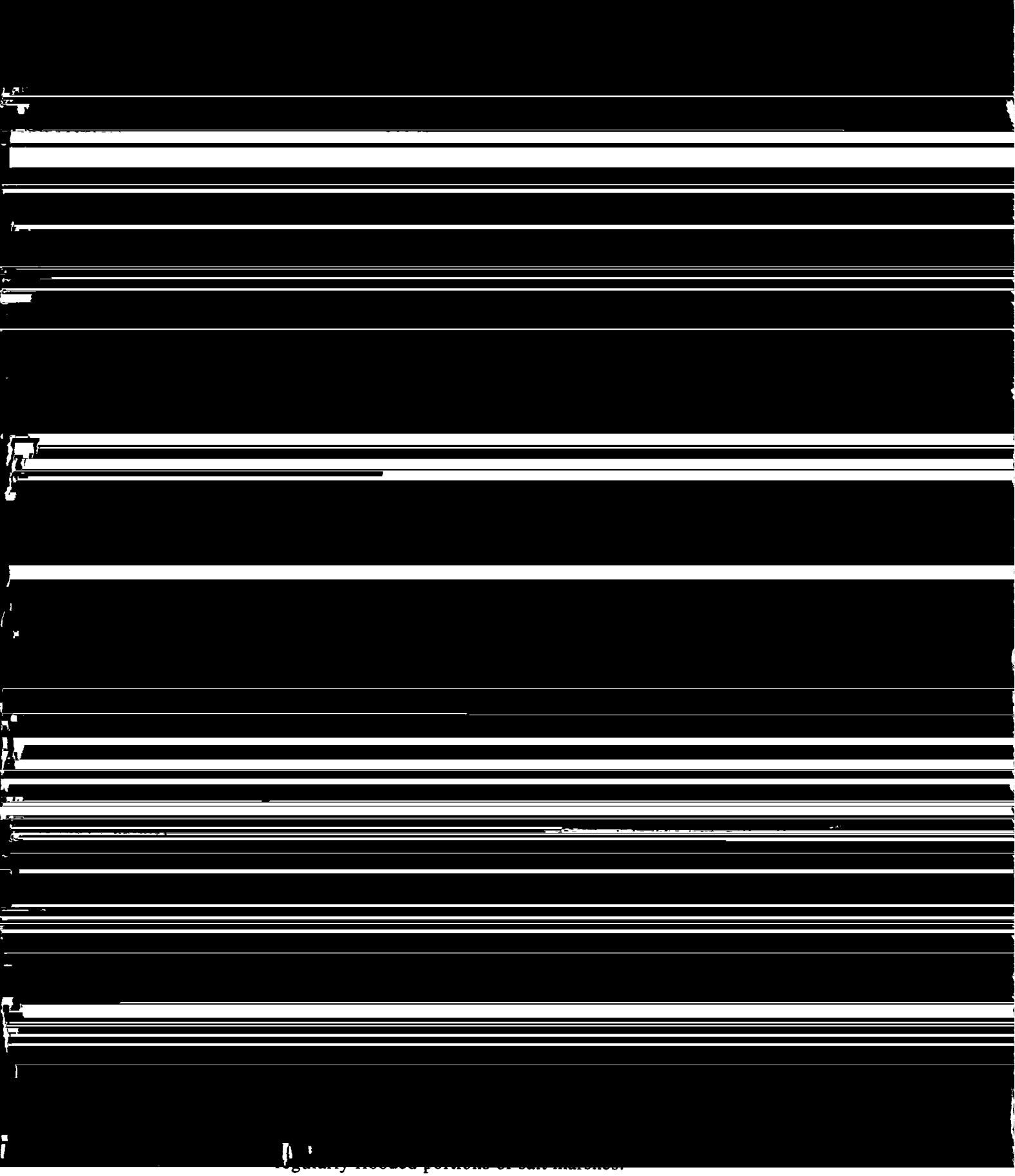
east of the mountains.

Pipe flow—Flow of groundwater that results from secondary porosity (macropores) often formed by decayed root channels or animal burrows.

[redacted]

ponents.

Propagules—Reproductive structures, as the seeds or cuttings from plants.



marshes, and peatlands.

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NSN 7540-01-280-5500

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Hydrodynamics [redacted]
Hydrogeomorphics