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News from....

# Hudsonia

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## REFLECTIONS ON HUDSON RIVER SHOREFRONT DEVELOPMENT



*"The lessons as well as the beauties of marshes await the perceptive, as do the lessons and beauties of the skies, of the seas, of the mountains, and of the other places remaining where man can still reflect upon lessons and beauties that are not of human making."*

*Paul L. Errington, Of Men and Marshes*



The shores of the tidal Hudson are a palimpsest: railroads, docks, brickyards, roads, dredge spoil deposits, homes, factories, and farms of the 18th, 19th and 20th centuries have been continually superimposed on each other and on a landscape rich in rare plants, rare animals, and archeologic sites. History should challenge developers, citizens' groups, and agencies to site, design, build and operate intensive land uses to minimize loss of ecological

values. This issue of *News from Hudsonia* discusses some of the impacts of shorefront development; the spring issue will highlight the biological diversity of the Hudson, its rare species and habitats.

### **The Shore Zone**

From the shallow waters and wetlands, up the bluffs or cliffs, the shore zone encompasses the steep, erodible slopes, and the lands that (because







of relatively impermeable substrates) contribute stormwater as surface runoff directly to the river and the steep lower reaches of tributary streams. The first tier of a boater's view is also the ecological buffer that helps protect the river from extremes of inflowing water, silt, and nutrients.

The shore zone contains highly altered habitats such as the oily cinders of the railroad embankments, limestone riprap, rotting timber bulkheads, eroding sandy dredge spoil, weedy or built-on landfill, paved promenades and parking lots, closely-managed grounds (lawns, gardens, etc.), beaches and bottoms covered with bricks, wood debris, or other artificial materials. These areas provide rootholds for plants, shelter for fish, and nesting spots for turtles, but the more rugged, weedy, common species of plants and animals dominate. Exceptions occur, such as an abandoned shale quarry or disturbed sandy mudflat with rare plants.

The less-altered habitats include muddy shallows, mudflats, tidal wetlands, rock, gravel or clay beaches, undeveloped islands and peninsulas, ravines of perennial or intermittent-flowing streams, tidal stream mouths, vegetated steep slopes, rocky hill crests and slopes, and occasional lowland forests. These habitats have all been disturbed somewhat but they support the uncommon and rare native plants and animals, the rare plant communities, the core areas for much of the river's production of fish, fur and fowl, and the Hudson's incomparable scenery. Many animals require combinations of more than one habitat type, e.g., marsh and forest, to complete their life cycle.

### Value Judgments

Special biological and cultural resources need to be identified and documented for effective land use planning. This is done at the proactive, whole-river scale (e.g., the New York Natural Heritage Program and the Hudson River Greenway), and at the reactive, site-specific scale (during environmental impact reviews). Both types of surveys are nec-

essary, expensive, and fallible.

Extensive natural landscapes, such as the Palisades, the bluffs of the Mid-Hudson Historic Shorelands Scenic District, and the Hudson Highlands, exist from one-half to two hours by car or bus from major population centers. These lands are both inordinately valuable as open space, and highly vulnerable to impacts of tourism, second-home and commuter-home development, and other activities. General impacts of development include loss of habitats and loss of habitat combinations, increased runoff, soil erosion and siltation, noise and visual disturbance to wildlife and people, increased trampling of sensitive soils and plants, generation of wastes (garbage, sewage, air pollution), and increases in populations of introduced species such as purple loosestrife where soils and vegetation have been disturbed.

### Siltation

Steep slopes with shallow topsoils underlain by clay, sand, or bedrock are vulnerable to sheet and gully erosion, slumping and sliding when disturbed. Under less-than-perfect management, development (logging, grading, construction) results in large quantities of sediment washing into the river and its tributaries. Not only does this silt accelerate the natural filling of wetlands and shallows, but the resulting turbid, nutrient-enriched waters and unstable bottoms are less useful habitats for many of the ducks, fishes, and other animals that we value.

Techniques for the control of soil erosion and siltation are available, and include a variety of mulches, silt fences, settling basins, and plantings. Although typically proposed in site plans, these devices are often not designed, built, maintained and monitored properly. It is nearly universal to see silt-laden runoff flowing under, over or around silt barriers on development sites — if there are barriers at all. Successful "bioengineering" techniques are being developed to use live and dead plant materials to stabilize steep slopes and stream banks. Some





areas, for example, the steep clay bluffs of the east bank from Staatsburg to Stockport, are unstable. These slopes are best left undeveloped, and caution should be exercised in trail construction and vista management.

### Habitat

Clearing land for development causes fragmentation of natural forest habitat, which may disproportionately reduce the value of remaining habitat to many species of animals and plants, exposing them to increased predation, parasitism and disturbance. Existing topography and vegetation can be used to conceal houses while preserving larger blocks of habitat.

Many riverbank dwellers, in historic tradition, want to clear vistas so they can see — and be seen from — the river. Vista management contributes to habitat fragmentation and can cause severe erosion. Hudson and Pacific Designs is experimenting with low-impact vista management at Montgomery Place. It should be possible to encourage low-growing plants at the expense of unwanted taller species.

Development farther up tributaries, via vegetation removal, soil erosion, and treated sewage, also contributes silt, nutrients, toxic substances and organic matter to the tidal river. How many environmental assessments of development on and near streams such as Fishkill Creek and Kinderhook Creek fairly address issues of off-site impact and cumulative impact on the tributaries and the river?

### Highways and Bridges

A new span has been proposed for the Mid-Hudson area. Observers have noted that certain species of geese and gulls are reluctant to fly under bridges. Bridge pilings and approach ramps must be located away from sensitive habitats onshore and in the river. Highways and bridge approaches are also barriers to the movement of animals and result in the death of individuals that make their way onto

the pavement. Experimental wildlife underpasses and overpasses, as well as fences and barriers to keep animals off roads, are under study in several states and European countries.

Bridge maintenance results in the deposition of toxic paint scrapings in the river. And, because bridges are more prone to ice than other road surfaces, much salt also ends up in the river. Non-toxic, non-chloride de-icing salts need development; one experimental compound, calcium magnesium acetate (CMA), is under study in the Adirondacks and elsewhere.

### Docks and Marinas

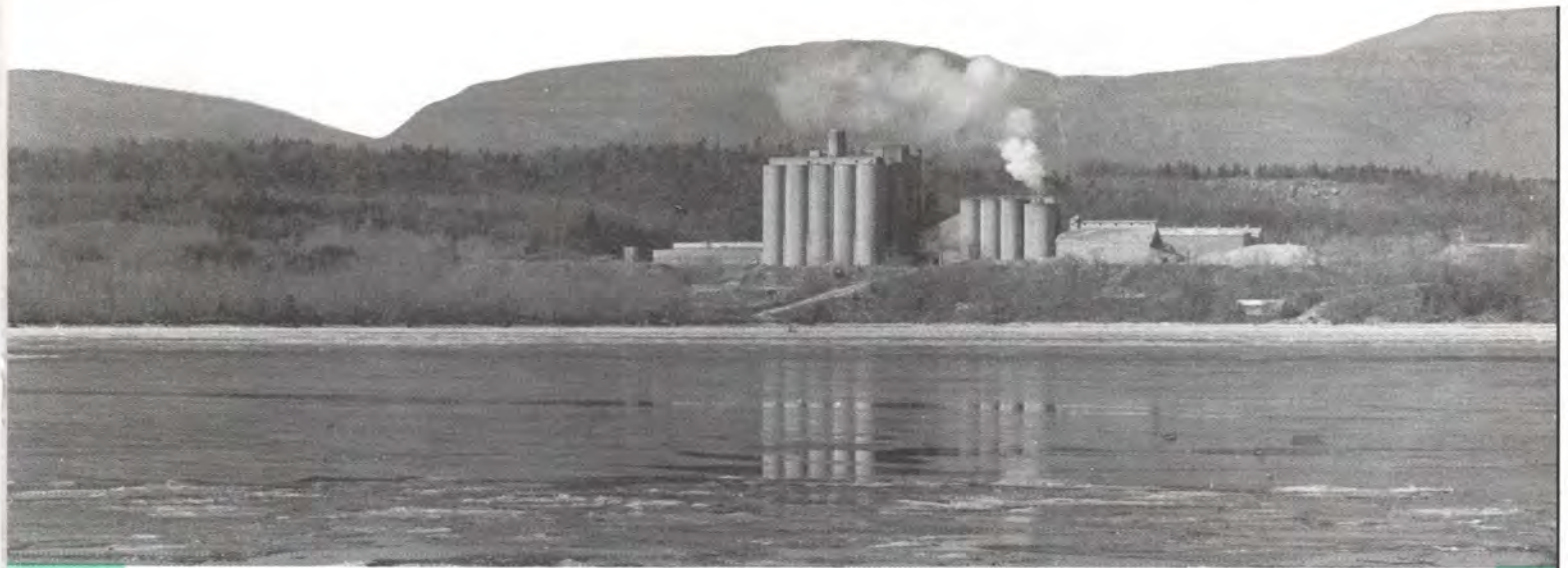
Recently, marina proposals at Piermont, Glasco and Kingston Point have generated controversy. Marinas in these shallow areas of the river would require repeated dredging with its attendant resuspension of sediments and mobilization of toxic substances therein, and loss of existing shallows habitat for fish, invertebrates and birds. Dock and breakwater structures and boat hulls are treated with antifoulant chemicals to inhibit colonization by algae and invertebrates that damage wooden pilings or increase the friction of hulls with the water. One such chemical, tributyltin (TBT), was recently banned in New York because of toxicity to invertebrates and other organisms.

The operation of motorized pleasure boats results in the dissemination of fuel combustion products, unburned fuel, and sometimes sewage. Boat wakes disturb fish and erode the shoreline, and motor noise is detrimental to birds. Subtidal vegetation, such as wild-celery and pondweeds which are so important to waterbirds and fish, is damaged by dredging, wakes, and direct hits by propellers. Speed limits and no-motor zones would reduce these impacts.

### Industrial Facilities

Coastal planners recommend that shorefront development be limited to those facilities and activ-





ities which by their nature require water access, e.g., water transportation, water-oriented recreation industries, fishery installations. Even river-related facilities, such as the coal terminal proposed at Cementon, potentially can release a variety of toxic materials in air, water and soil if not sited, designed, built and operated meticulously.

Power plants have a major impact because of the numbers of fish, both adults and early life stages (eggs, larvae, juveniles), that are sucked into the cooling water intakes (entrainment) or dashed against the intake screens (impingement). Even the inland power plant proposed for Red Hook will draw cooling water from the river. Recent progress has been made with “angled screens” to reduce impingement. The siting of water intakes for industry and for public water supply is still a crucial concern and requires detailed knowledge of the distribution of fishes and other organisms.

### Utility Crossings

Electric transmission lines, gas pipelines, and telephone lines need to cross the Hudson. Installation causes at least temporary disturbance to bottom communities, and temporary or permanent damage to the shore. The exact location of a crossing can be selected to minimize impacts by avoiding a marsh, a mudflat with rare plants, or an old-growth forest on the shore. The extent of disturbance can be reduced, and damaged habitats can be revegetated with native plants.

### Parks and Historic Restoration

Historic sites, recreation opportunities, and high-quality Hudson River natural areas often coincide, allowing joint preservation. This has occurred at the Franklin Roosevelt home, Constitution Island Marsh, and Montgomery Place. Yet we must plan restoration and public use of historic sites (including vista management, trail use, parking lots, pond restoration, sewage treatment, and the protection of ornamental plants from pests) to minimize impacts

on special biological resources. Tourism ill-managed can be as dangerous as subdivisions and oil spills.

At Montgomery Place, Hudsonia’s surveys for management planning revealed three species of aquatic plants listed as rare by the New York Natural Heritage Program, one of them in a pond under consideration for dredging. Our documentation of the old-growth forests resulted in strengthened protection of these impressive, possibly “virgin”, habitats.

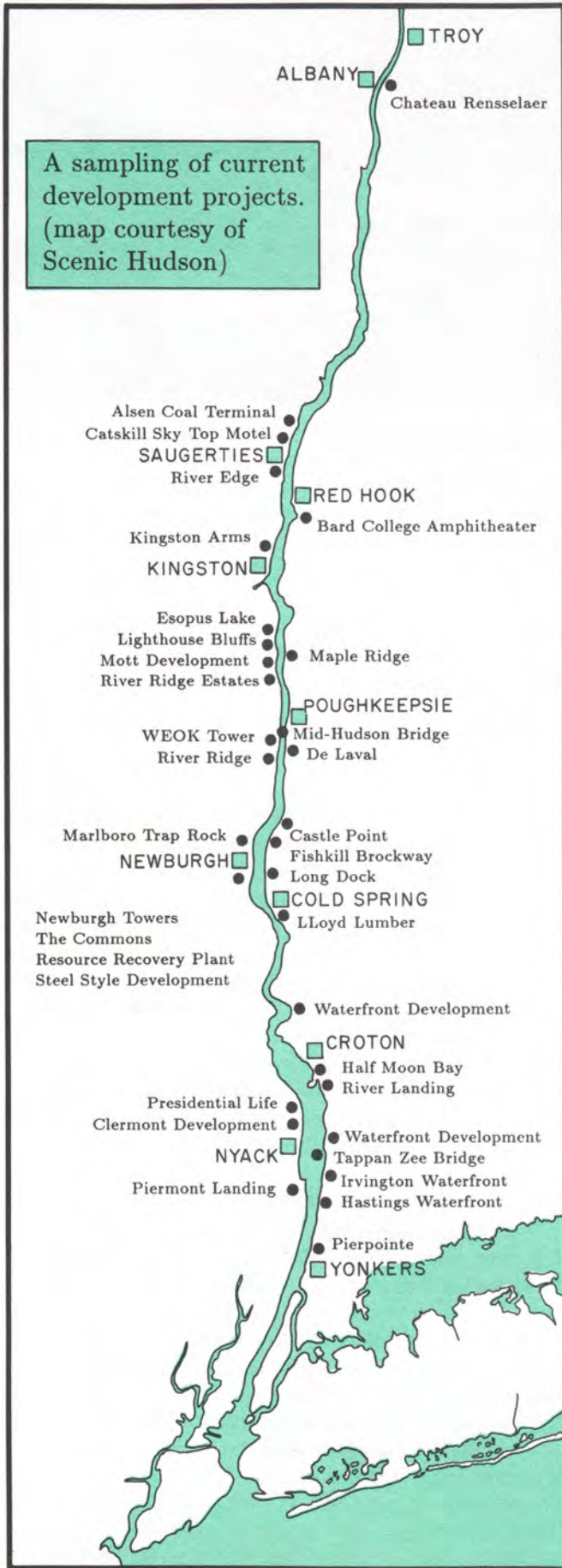
### Logging, Mining

Both land uses cause substantial alteration of vegetation and soils, with generation of silt and dust. Just before state acquisition of lands at Tivoli North Bay, a private logging operation resulted in locally clearcut patches, removal of old hardwoods on steep bluffs, erosion of the banks of intermittent streams, theft of unmarked trees in the tidal swamp, and the destruction of a private paved road formerly used as a bicycle path. Logging and mining are necessary but may not be appropriate in or near high-quality natural areas containing rare species and rare plant communities. At least, locally-occurring plant communities should be recreated in damaged habitats using native plant species; if this cannot be done, the habitats should not be exploited.

### Repair and Restoration

Preservation may not be enough; past damage may need repair. There is little information on the composition of plant and animal communities before the industrial and agricultural transformation of the Hudson. Rather than trying to restore to some supposed pristine character, I recommend enhancing damaged habitats to improve their quality for rare, declining, economically useful or otherwise valuable native organisms — in urban as well as rural areas. Because very little explicit habitat restoration or creation work has been done in the Hudson Valley, these projects must be considered experiments, and they demand clear-headed scien-





tific planning and follow-up monitoring to improve our knowledge for future work.

Hudson and Pacific Designs will be planting ornamental native species in the mouth of Andre Brook in Tarrytown, and the Museum of the Hudson Highlands is planning a habitat enhancement project in a littoral swamp at Cornwall. New York's Local Waterfront Revitalization Program is encouraging ecological repair to stimulate economic development.

### Greenway

Many economic and environmental interests are cooperating to preserve extensive open space in the river corridor. Beyond the important goals of protecting scenic values, recreation areas and historic sites, it is crucial that biological conservation be given its due. A Hudson River Greenway that preserves the combined natural and cultural landscape will return double the dividends to society. But ecologists and naturalists must be consulted early and often, so that planning can encompass the subtleties of rare species habitats, exemplary natural communities, corridors of biological dispersal and migration, expansion space as a hedge against global warming and sea level rise, and the opportunities for environmental research and education.

Significant contributions to the Greenway and to local conservation can be made by proactive design of residential and commercial developments and their contained open space areas. Why demand less during environmental impact reviews? Our municipal planning boards and conservation councils badly need members willing to assert themselves in the cause of balanced economic and environmental interests — maybe you. Naturalists should practice diligent and accurate recording of local plant and animal communities in both natural and altered habitats, with advice from professional field biologists, so these data will be available to the review process. Educational activities of the Hudson River National Estuarine Research Reserve, Hudson River Sloop Clearwater, Hudsonia, and other organizations provide training.

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