

The Hudson River Energy Landscape of the Past



*Glenwood Power
Station, Hudson River,
Yonkers, NY*

(IEEE Power & Engineering, July/Aug 2014)

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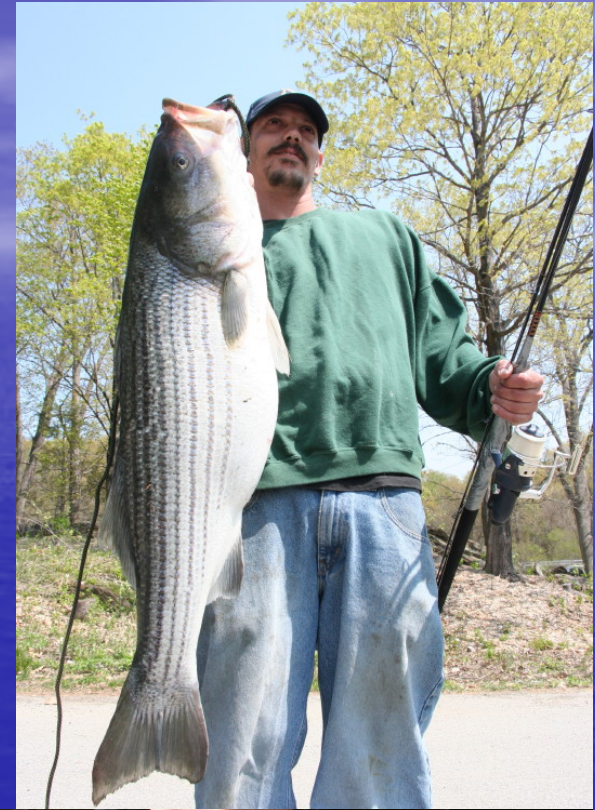


The Hudson River Energy Landscape of the Past

Of all the natural-resource disputes resolved in recent years through mediation, perhaps none was as complex or as significant as the so-called Hudson River settlement, the conclusion of a 17-year war between and among three environmental groups, four public agencies, and five electric utility companies over the use of the Hudson River for producing electric power.*

*Talbot 1983. "Settling Things: Six Case Studies in Environmental Mediation (p. 7)

Energy Landscape of the Past



*All about power,
water,
and fish...*



About modeling, engineering, and commercial fishing.

OAK
RIDGE
NATIONAL
LABORATORY

UNION
CARBIDE

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THE IMPACT OF ENTRAINMENT AND IMPINGEMENT ON FISH POPULATIONS IN THE HUDSON RIVER ESTUARY

VOLUME III

Analysis Of The Validity Of
Fishermen's Stock-Recruitment
Estimation Exercise And "Prior
Distribution of Beta" Technique

S. W. Christensen
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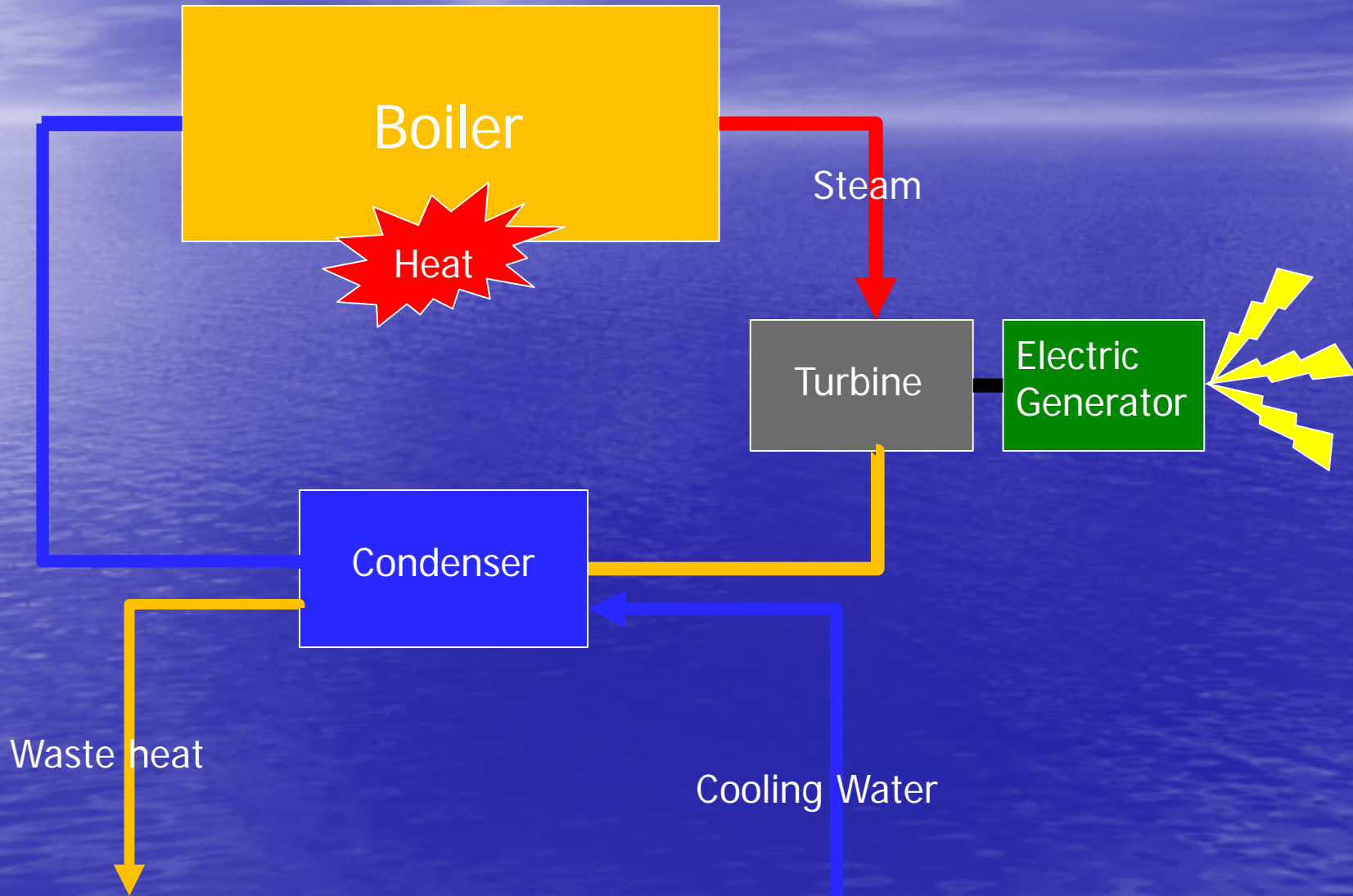


It was all about the survival of one species of fish....

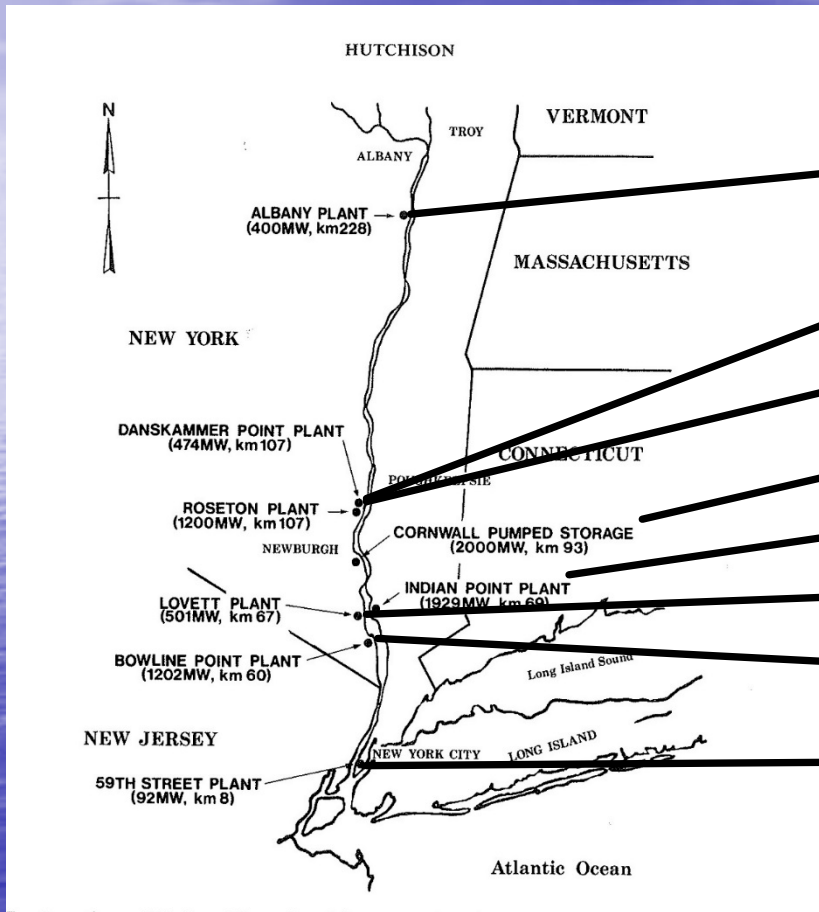


Striped bass

Steam Power Basics



The Issue

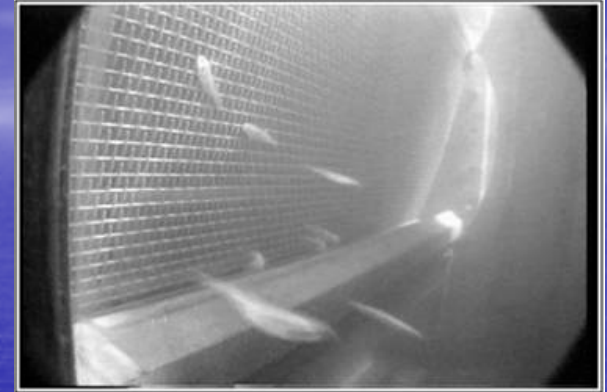


<i>Facility</i>	<i>Flow (GPD)</i>
<i>Albany Steam</i>	506,855,300
<i>Danskammer</i>	424,801,300
<i>Roseton</i>	922,945,300
<i>Storm King</i>	13,428,390,000
<i>Indian Point</i>	2,506,125,000
<i>Lovett</i>	456,299,100
<i>Bowline</i>	1,105,807,000
<i>59th Street</i>	241,901,300
TOTAL	19,593,125,300

Adverse Environmental Impact

- Impingement mortality

- Larger fish and aquatic organisms trapped against intake screens
- Many of these fish were landfilled



- Entrainment

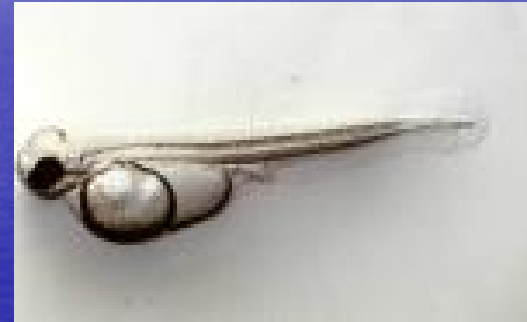
- Fish eggs and larvae pass through cooling system
- Discharged back to waterbody
- Mortality is species, lifestage, and facility specific



How Many Fish?

Impingement:

- Indian Point – 500,000
- Roseton – 50,000
- Bowline – 30,000



Nearly 600,000 Annually



Entrainment:

Indian Point – 1.2 Billion
Roseton – 692 million
Bowline – 124 million

Over 2 Billion Annually

At the Heart of the Battle:

Cornwall Pump Storage Facility at Storm King



What will happen to the Hudson River striped bass population?



13 billion
gallons per day

Stakes were high...

- For the Power Industry:
 - Cooling towers for several of the power plants
 - Prohibit the construction and operation of the Cornwall Pump Storage Station
- For the Hudson River
 - Loss of a traditional livelihood
 - Potential devastation to the Hudson River fish community

The Hudson River Settlement

*Talbot 1983. "Settling Things: Six Case Studies in Environmental Mediation (p. 7)

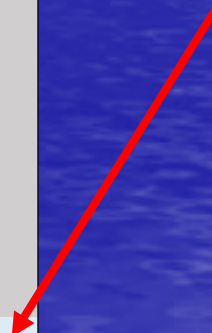
Of all the natural-resource disputes resolved in recent years through mediation, perhaps none was as complex or as significant as the so-called Hudson River settlement, the conclusion of a 17-year war between and among three environmental groups, four public agencies, and five electric utility companies over the use of the Hudson River for producing electric power.*

- ▶ Con Ed surrendered federal license for Storm King
- ▶ Utilities supported fisheries monitoring program - \$2 million annually
- ▶ Established Hudson River Foundation – initial endowment of \$12 million
- ▶ Required a 10 year fisheries study

Steam Electric Power Yesterday, Today, & Tomorrow

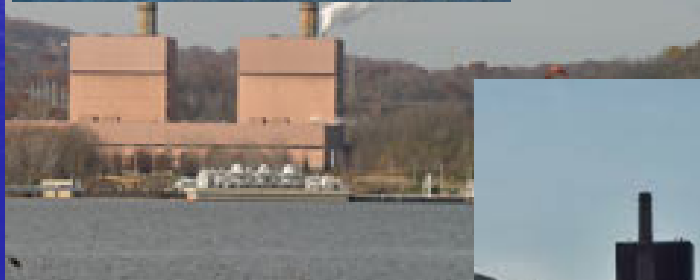
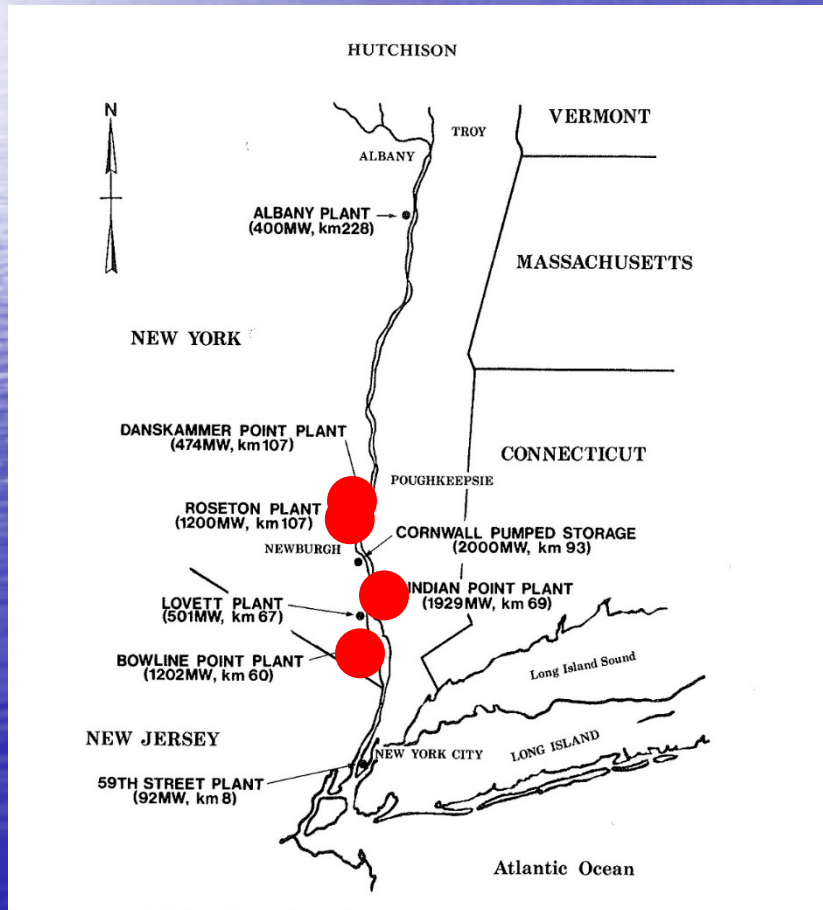
<i>Facility</i>	<i>Flow (GPD)</i>		
	<i>1970s</i>	<i>2017</i>	<i>2021</i>
<i>Empire Generator</i>		0	0
<i>Albany Steam</i>	506,855,300	8,500,000	8,500,000
<i>Athens</i>		0	0
<i>Danskammer</i>	424,801,300	424,801,300	424,801,300
<i>Roseton</i>	922,945,300	922,945,300	922,945,300
<i>Storm King</i>	13,428,390,000	0	0
<i>Indian Point</i>	2,506,125,000	2,506,125,000	0?
<i>Lovett</i>	456,299,100	0	0
<i>Bowline</i>	1,105,807,000	1,105,807,000	1,105,807,000
<i>59th Street</i>	241,901,300	4,320,000	4,320,000
TOTAL	19,593,125,300	4,972,500,000	2,466,400,000

**86%
Reduction**



Energy Landscape of the Past?

<i>Facility</i>	<i>Generating Capacity (Annual MWhr)</i>	<i>Cooling water Capacity (MGD)</i>
Indian Point Units 2 & 3	20,258,226	2,500
Bowline, Roseton, Danskammer	25,167,186	2,300



Thank you



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Department of
Environmental
Conservation