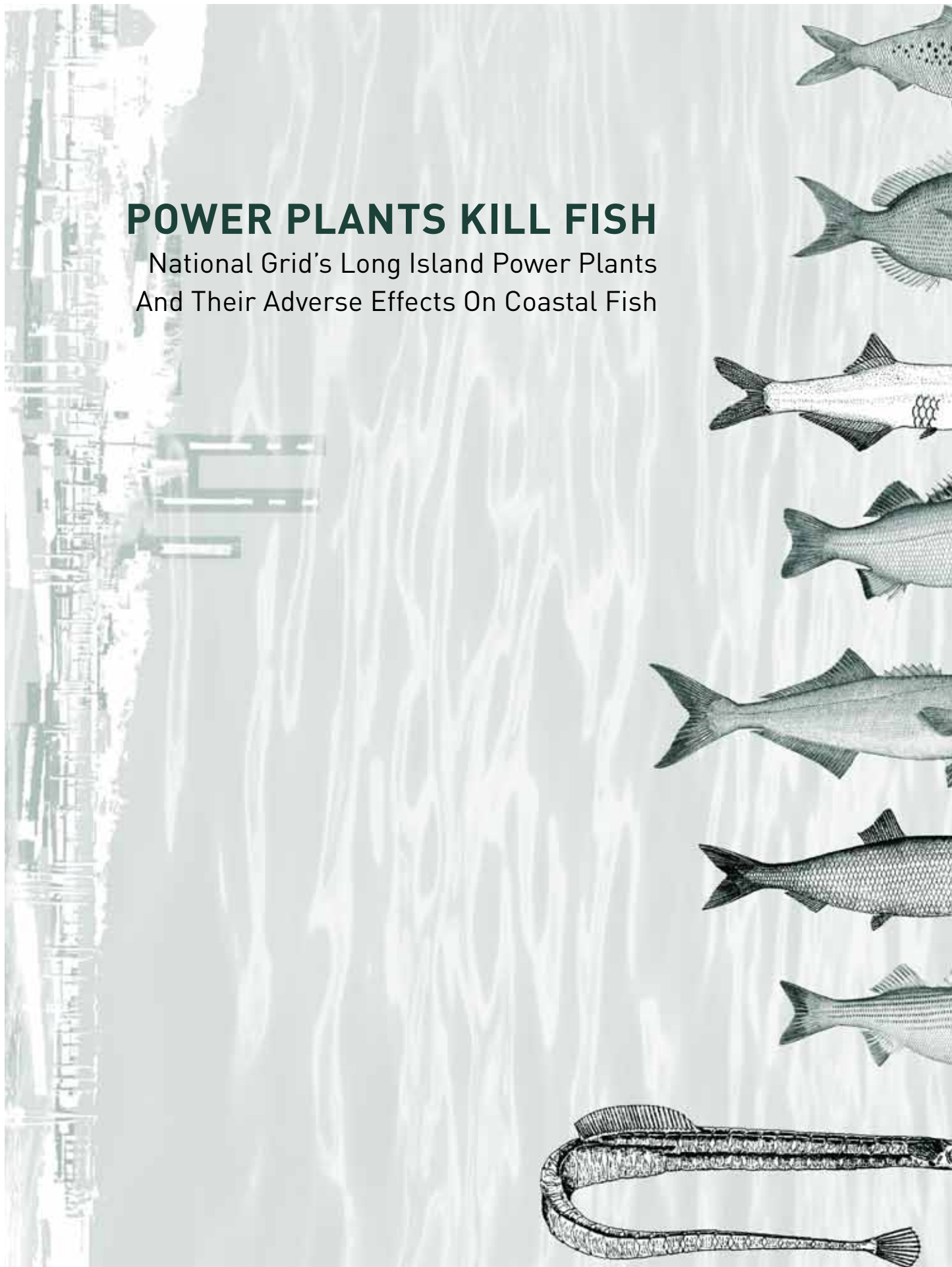
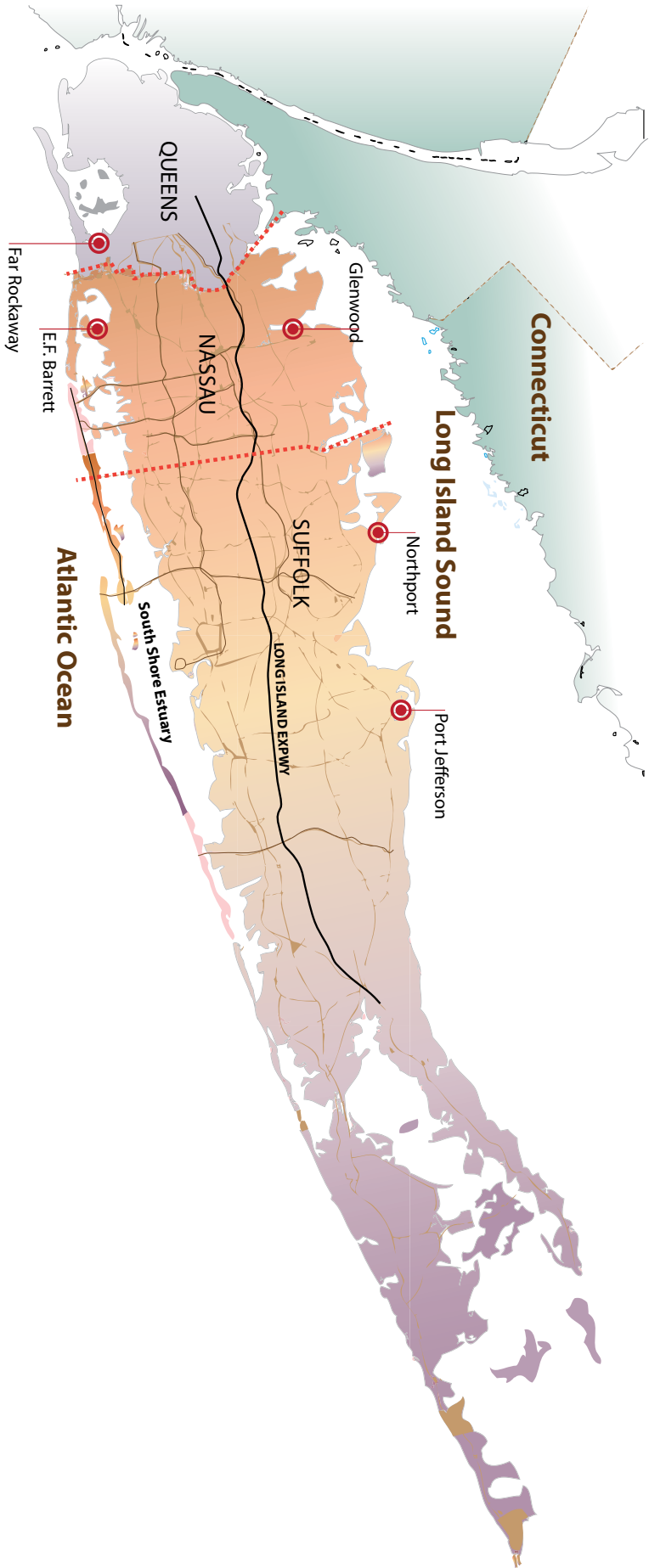


POWER PLANTS KILL FISH

National Grid's Long Island Power Plants
And Their Adverse Effects On Coastal Fish





WHY IS THIS A TIMELY ISSUE?

The New York State Department of Environmental Conservation is currently reviewing draft State Pollutant Discharge Elimination System permits for each of the five National Grid power plants on Long Island.

JULY 2009

Long Island's coastal resources face an endless torrent of threats and its commercial and recreational fishing industries are struggling to survive. One little-known contributor is the effect that National Grid's five power plants have on aquatic life. The five plants destroy billions upon billions of fish each year in the course of withdrawing water for their "once-through" condenser cooling systems. The fish that are killed are primarily in the form of eggs, larvae and young hatched fish. The next generations of aquatic life needed to replenish decimated fish stocks are continually destroyed by these power plant withdrawals, undermining species recovery and diminishing a significant source of food for other marine species.

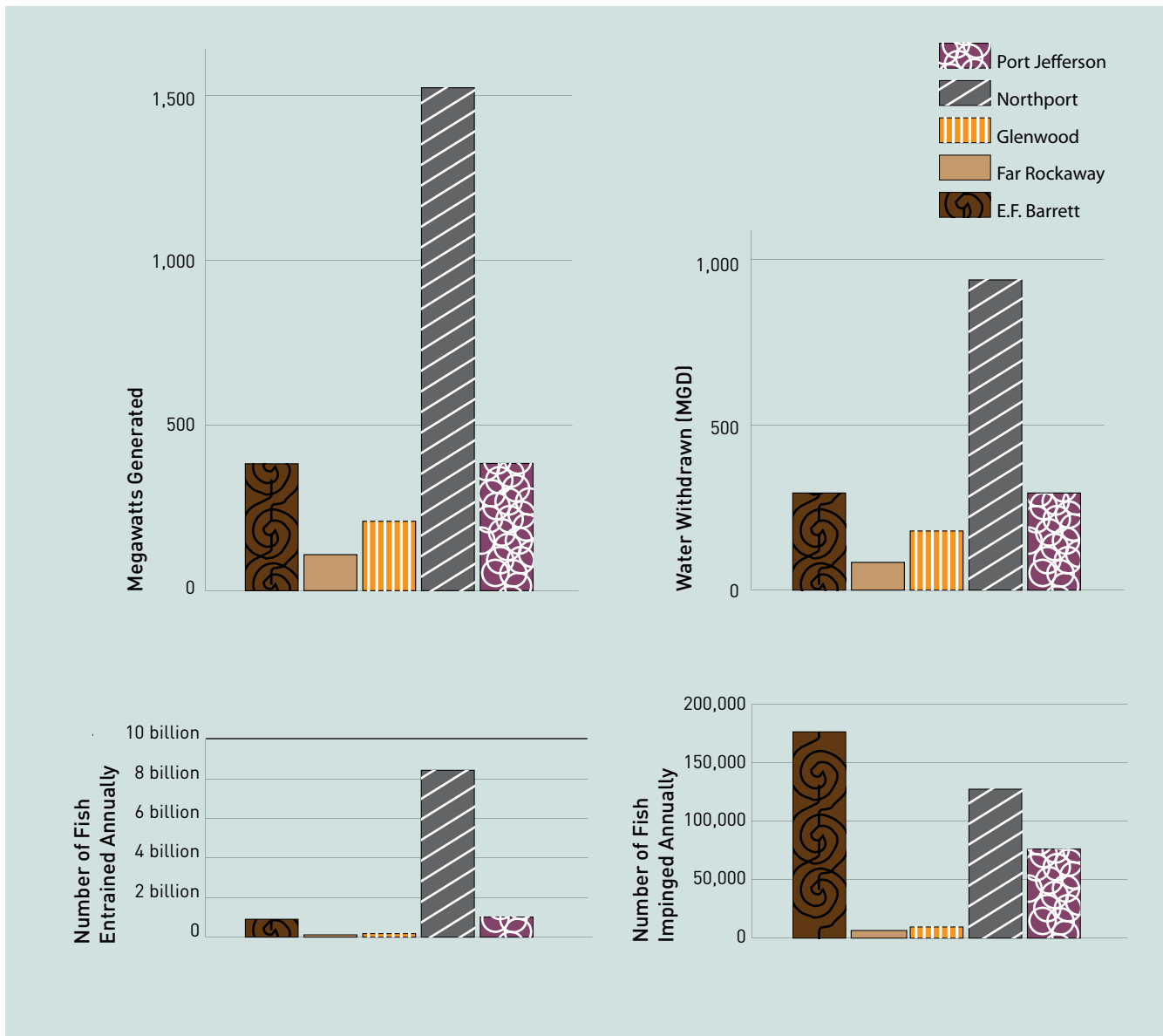
Combined, all five Long Island National Grid power plants can withdraw nearly 2 billion gallons of water each day for condenser cooling. (See table on page 4.) On the north shore, the Port Jefferson, Glenwood and Northport plants can withdraw over 1.5 billion gallons of ocean water daily from Long Island Sound and its embayments. On the south shore, the Far Rockaway and E.F. Barrett plants can take in 378 million gallons daily.¹

As shown in the table on page 4, approximately 10.6 billion fish—in the early stages of development—are killed each year by these five National Grid-owned power plants through a process called **entrainment***. Nearly 400,000 additional fish are injured or killed through **impingement**. Aquatic life and marine habitats can also be adversely impacted by thermal pollution associated with the heated water discharged from a power plant's **once-through cooling system**. However, the specific impacts of thermal pollution are not discussed in this briefing.

* See page 10 for all bold italic words.

Annual entrainment and impingement rates at the five National Grid power plants²

Facility	Owner	Megawatts Generated	Water Withdrawn (MGD)	Water body	Entrainment	Impingement
E.F. Barrett	National Grid	384	294	Barnum's Cove	906,259,233	176,044
Far Rockaway	National Grid	109	84	Jamaica Bay	117,662,685	6,560
Glenwood	National Grid	210	179	Hempstead Harbor	177,879,210	9,562
Northport	National Grid	1,522	939	L.I. Sound	8,430,808,238	127,118
Port Jefferson	National Grid	392	294	Pt. Jeff. Harbor	1,014,950,951	76,104



As illustrated in the table on page 4, the Northport plant has the greatest rate of entrainment, followed by the Port Jefferson and E.F. Barrett plants. With respect to impingement, the E.F. Barrett plant has the greatest effect, followed by the Northport and Port Jefferson plants.

On July 16, 2009 the New York State Department of Environmental Conservation (DEC) released a draft **State Pollutant Discharge Elimination System (SPDES)** five-year permit for the Port Jefferson Power Station with the public given a 30-day window to submit written comments. The DEC is also reviewing SPDES permits and “best technology available” options for the Northport, E.F. Barrett, Glenwood and Far Rockaway power plants. Draft SPDES permits for these other plants will be released one-by-one over the course of the next few years.

The DEC’s **Bureau of Habitat’s Steam-Electric Unit** coordinates the permit review process and develops the specific “best technology available” recommendations for each plant.



Northport



Port Jefferson



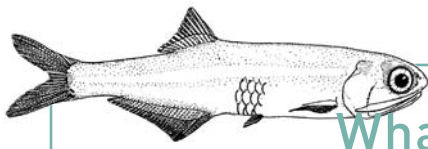
E.F. Barrett



Far Rockaway



Glenwood



What's at stake? An Economic and Ecological Resource

Bordering Long Island's north shore is Long Island Sound, a federally-designated Estuary of National Significance. Despite its urbanized watershed, this massive estuary remains highly productive with a diverse array of habitats that provide feeding, nesting and nursery areas and shelter for finfish, shellfish, plankton, birds and other wildlife. Activities such as commercial and recreational fishing, beach swimming and boating generate more than \$8 billion annually in the Sound's regional economy³. Its ecological and economic value makes Long Island Sound one of the most important estuaries in the nation.

Long Island's south shore is a highly productive and expansive system of salt marshes, eelgrass beds, intertidal flats, tributaries and beaches. Established by the New York State Legislature, the South Shore Estuary Reserve encompasses a 326 square mile watershed in Nassau and Suffolk counties. The reserve supports a diversity of rare, threatened and endangered species of plants and animals, and is also home to the largest concentrations of commercial and recreational vessels and marinas. The reserve supports approximately 3,000 water-dependent and water-enhanced businesses employing nearly 30,000 people.

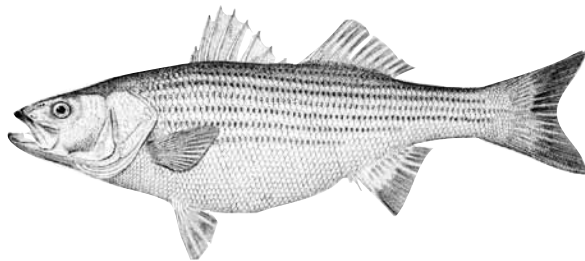
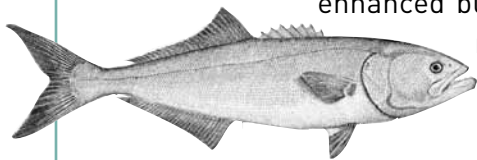


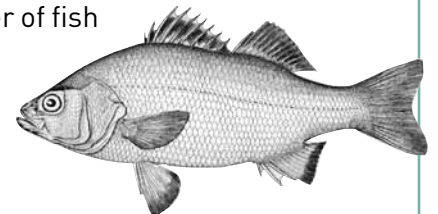
Illustration Credit: Northeast Fisheries Science Center



Credit: NOAA Photo Library

Long Island's fishing industry

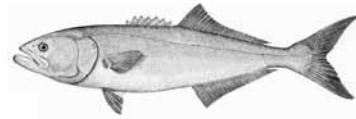
Long Island's fishing industry along both Long Island Sound and the south shore has experienced extreme shifts over the past decades. Oysters were decimated by disease in the mid 1990's, their harvest now essentially restricted to Oyster Bay. After reaching an all-time high of nearly 12 million pounds in the 1990's, the annual Long Island Sound lobster harvest plummeted to under 2 million pounds in recent years due to massive die-off at the turn of the century, and has shown little sign of recovery. Clamming, once a booming industry in Great South Bay that pulled in 700,000 bushels per year in the 1970's, now struggles to find 10,000 bushels. Groundfish, such as haddock, cod, halibut and flounder, are subject to new federal fishing restrictions due to low populations. Winter flounder, in particular, is one of the most devastated fisheries in Long Island Sound, with landings by recreational anglers plummeting from 1 million fish in the early 1980's, to fewer than 5,000 in 2007. The extent to which Long Island power plants have impacted the local fishing industry has never been assessed but should be studied considering the number of fish being destroyed.



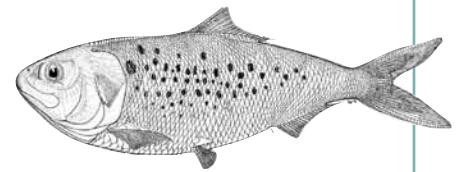
New Federal Rule in the Works

The U.S. Supreme Court recently issued a narrow ruling in a lawsuit challenging an Environmental Protection Agency (EPA) rule intended to lessen the destruction of aquatic life through water withdrawals by power plants. The court held that the federal **Clean Water Act** does not forbid—nor does it require—EPA from comparing costs with benefits when regulating power plant cooling water intakes. EPA will now have to rewrite its rule for power plants and their effects on aquatic life.

By modernizing plants to recirculate water, rather than continually take in more, the harm to fish and other waterborne life can be drastically reduced. The best technology available already exists to stop this environmental destruction: **Closed-cycle cooling**—the industry standard for new power



plants—reduces power plant water intake by over 95 percent through recirculation, thereby reducing marine life mortality by at least 95 percent.



RECOMMENDATION

Take responsibility and reduce the impact

The EPA will be drafting a new rule for power plants and their effects on aquatic life, which the Long Island Power Authority (LIPA) acknowledges in its 2009-2018 Draft Electric Resource Plan. It is primarily the power plant owner's responsibility to implement the best technology available. The five power plants addressed in this briefing are owned by National Grid, but LIPA is currently evaluating whether to purchase one or more of these plants. In another possible scenario, the New York Power Authority (NYPA) may take over ownership of some of the National Grid plants. If LIPA or NYPA become owners of one or more of these plants, the primary responsibility of implementing the best technology available will become theirs.

While LIPA does not currently own any of the five plants, it could still play a key role in helping to reduce the environmental effects of withdrawing nearly 2 billion gallons a day from Long Island's coastal waters to cool these antiquated plants, which LIPA currently depends on to fulfill most of its customer electric demand. Appendix A of LIPA's Draft Electric Resource Plan 2009-2018 discusses LIPA's partnership with NYSERDA and National Grid "... to test a new technology patented by a local firm."⁴ The ***Substratum Intake System (SIS)***—as the technology is called—"could dramatically reduce biological impacts from surface water use as well as increase power plant efficiency." LIPA's draft plan explains the goals and targets associated with SIS. Timely updates on an SIS pilot demonstration and its results will reveal the technology's potential.

While it is laudable that LIPA is part of the SIS evaluation, LIPA (and National Grid) should be more proactive and comprehensive in planning to reduce water withdrawal and aquatic impacts. The SIS technology may be years away from commercial availability, even if proven useful. LIPA's plan to significantly reduce adverse effects on air quality, climate and public health should

expand to include effects on aquatic life.

In response to the ongoing economic and environmental degradation that is being caused by the cooling water intake systems at National Grid's power plants, LIPA's Draft Electric Resource Plan should be revised to include a clear plan with specific goals to significantly reduce harm to aquatic life, going beyond the goals it has set with respect to the SIS technology.

Both LIPA and National Grid can work together to reduce the impact in several ways:

- Retrofitting power plants with the best technology available for cooling water intake, preferably closed-cycle cooling technology.
- Even greater investment in energy efficiency and renewable generation, reducing the operating time of these older plants, maybe leading to the retirement of at least one of these plants.
- Repowering Long Island's steam electric plants with combined cycle technology to increase their efficiency and lower their emissions. A power plant that is being repowered is also required to use best technology available with respect to the plant cooling system. The cost of incorporating closed-cycle cooling during a repowering project would be significantly less than simply retrofitting an existing power plant. (The benefits of repowering must be carefully evaluated in comparison to the benefits associated with even greater investment in energy efficiency and renewable generation.)



Credit: National Renewable Energy Laboratory

DEC should set the bar high

Prior to the release of EPA's new rule, the DEC will be responsible for ensuring that National Grid or any other owner of these five plants uses the best technology available to minimize impingement mortality rates and entrainment rates. In its final permits, DEC should recommend that each plant use the best technology available and drastically reduce their negative effects on marine life, thereby fulfilling National Grid's responsibilities under the federal Clean Water Act and New York State regulations. Among the recommendations that DEC should seriously consider requiring of National Grid are closed-cycle cooling and power plant or unit retirement.

What others can do

There is an important role for homeowners, institutions, municipalities and business owners to play: installing on-site distributed renewable energy systems like solar electric panels (photograph above) will lower the demand for electricity produced at the five National Grid power plants. This reduced demand will result in decreased power plant operating time, resulting in lower carbon emissions, less water withdrawals and fewer impinged or entrained fish and other marine life

A related brochure describes specific actions that the public can take regarding the state permit review process for each power plant.



Background Information:

Entrainment: Takes place when small organisms, such as eggs and larvae, are sucked into a power plant's cooling system along with the massive withdrawal of cooling waters from a water body.

Impingement: Occurs when larger fish (and other aquatic organisms) are trapped against the screens that filter large debris from the intake structures during cooling water withdrawal.

Once-Through Cooling: All five of the National Grid steam electric plants on Long Island use once-through cooling. Water is drawn into the power plant from a local body of water to absorb heat and is then discharged back into the water body at an elevated temperature.

State Pollutant Discharge Elimination System (SPDES): New York State has a program which has been approved by the United States Environmental Protection Agency for the control of wastewater and stormwater discharges in accordance with the Clean Water Act. Under New York State law the program is known as the State Pollutant Discharge Elimination System (SPDES) and is broader in scope than that required by the Clean Water Act in that it controls point source discharges to groundwaters as well as surface waters. A power plant with once-through cooling discharges a significant amount of cooling water into a surface water body, typically the same water body from which it had withdrawn water.

NYSDEC's Bureau of Habitat's Steam-Electric Unit: The SEU is made up of biologists primarily working to mitigate the adverse aquatic impacts resulting from the operation of fossil fuel and nuclear generating stations. The goal of the SEU is to minimize the mortality to fish caused by the operation of power plants and other large water intakes. The SEU is at the national forefront in applying state of the art technology to achieve the for mitigating impacts from cooling water intakes. More info about the SEU and power plant aquatic impacts can be found at: <http://www.dec.ny.gov/animals/32847.html>

Clean Water Act: EPA is developing regulations under section 316(b) of the Clean Water Act that require that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. For further details on the EPA's cooling water intake regulations: <http://www.epa.gov/waterscience/316b/>

Closed-Cycle Cooling: In a closed-cycle **wet** cooling system, cooling water is circulated first through the plant to absorb heat, then through the cooling towers to evaporate heat to the atmosphere and condense steam back to water to be recirculated through the plant. A closed-cycle **dry** cooling system uses radiator-type coils to transfer heat to air passing over the coils.

Substratum Intake System (SIS): SIS withdraws water from a saline aquifer, as opposed to surface waters. According to its designers, SIS has environmental and operational advantages, including reductions in impacts to fish eggs and larvae, increased thermal efficiency, and reduced maintenance. The LIPA-NYSERDA-National Grid evaluation "is assessing the potential of a pilot demonstration and whether the technology can be scaled up to commercial availability as a method to reduce impacts and improve efficiency."

ENDNOTES

- 1 Water withdrawal estimates represent the design capacity of the five National Grid power plants' cooling water systems and vary depending on electricity load demand. It is important to note that annual variations in cooling water use and fish abundances can have a substantial effect on the numbers of organisms impinged and entrained in any given year.
- 2 This estimate is based on flow rates and numbers of fish collected during the respective study year for each plant by consultants to National Grid. The study year range is 2003-2006. Water withdrawal estimates represent the design capacity of the five National Grid power plant's cooling water systems and vary depending on electricity load demand. It is important to note that annual variations in cooling water use and fish abundances can have a substantial effect on the numbers of organisms impinged and entrained in any given year.
- 3 \$8 billion is an inflation-adjusted estimate based upon the \$5 billion estimate in 1992 by Dr. Marilyn A. Altobello ("The Economic Importance of Long Island Sound's Water Quality Dependent Activities") on behalf of the Environmental Protection Agency.
- 4 Page 3-10 of Appendix A, Technical Report (Dated: June 11, 2009), LIPA Draft Electric Resource Plan 2009-2018 <http://www.lipower.org/pdfs/company/projects/energyplan09/energyplan09-a.pdf>



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ABOUT CITIZENS CAMPAIGN FOR THE ENVIRONMENT (CCE)
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NOTE: This report was prepared with the best information available at the time. We welcome any new information as we strive to make this report as accurate and up-to-date as possible.

