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Connetquot River State Park Trout Hatchery : Victim of Nature and Dysfunctional Government

For over 120 years, until January 1st, 2009, the last 36-years of which have been under the auspices of New York State Parks, the hatchery on the Connetquot River has produced countless thousands of vigorous, superbly-conditioned and well-adapted trout. Innumerable anglers, especially the handicapped, have enjoyed superb fishing on an “assigned-beat” system, possible only because of the regular stocking of the river. Moreover, hundreds of schoolchildren and adult visitors to the Park Preserve have been able to witness the trout “husbandry “in action. From its 19th-century beginnings until the present, this hatchery has played an integral part in the history of Long Island, New York State, and the history of trout fishing in America. Indeed, the facility has been listed on the National Register of Historic Places.

Now a virus, a set of well-meaning but ill-conceived environmental regulations, a slothful bureaucracy, an antiquated design, and an economic downturn have conspired to do what natural disasters, two world wars, and the Great Depression could not: bring its operations to an indefinite halt.

The Idle Hour Fly Fishers, a club dedicated to the support of the Connetquot River Preserve (CRSPP) and its fishery, have been actively, but quietly, involved in discussions with NYS Parks (OPR-HP) and the NYS Department of Environmental Conservation (NYSDEC) about this problem . We believe, however, that the time has come for us to disseminate our position in the hope that the public will join us in demanding a better, swifter, and more logical response from our governmental institutions.

WHY THE CLOSURE

In 2007, following “emergency” regulations instituted by NYSDEC, every state-licensed fish hatchery in NY underwent testing for a large number of possible fish diseases (more on this later). The trout in the CRSPP hatchery tested positive for *Infectious Pancreatic Necrosis* virus (IPNV), one of the “proscribed” diseases. *There had been NO outward signs of any illness affecting the trout.* The regulations forbade the stocking of any infected fish into NYS waters after Jan. 1st, 2009. After consultation between Parks personnel and the NYSDEC, it was decided to immediately cease stocking any trout up-stream of the hatchery, destroy the existing fingerling trout population, utilize the older fish for stocking downstream of the hatchery only, and require only the use of plain rubber-soled boots below the hatchery (up-stream wading already having been banned for years) in an attempt to prevent spreading the disease .In the interim, NYSDEC permitted the CRSPP to obtain disease-free trout eggs and fingerlings from outside sources and raise them during 2008, with the proviso that the yearlings would have to be re-tested. The eggs were incubated using a different water source, but still part of the stream system. Unfortunately, the resultant fry were not tested for IPNV before being transferred to the raceway ponds.

The re-test of yearling rainbow & brook trout took place in November, 2008. Some 46 of 60 sampled brook trout, and 1 of 60 sampled rainbow trout again tested positive for IPNV .Having been held in the raceways for most of a year, no original source of infection (incubating water, raceway water, or contaminated raceway sediments) could be pinpointed. As a result, NYSDEC put the hatchery’s operating permit in-abeyance until it could demonstrate that the fish reared were free of diseases. Moreover, OPR-HP was directed to seek the help of professional consultants to investigate how or whether the existing hatchery could become re-operable. Just prior to the December 31st, 2008 deadline, all remaining trout in the hatchery were released into the river downstream of the hatchery. Because of competition for food, most of these fish found their way into the estuarine portion of the river where they were caught in large numbers by anglers outside the Park.

The CRSPP hatchery remains shuttered to this date. To keep the Park open for fisherfolk, a small number of trout of ‘stockable’ size have been purchased/obtained by OPR-HP and placed in the lower river. But, as a result of the closure, the fishing public has stayed away in droves, unwilling to pay \$20.00 for four hours in which hardly any fish are to be seen, let alone caught.

THE VIRUS AND THE WATERSHED

IPNV is a double-stranded, non-enveloped RNA virus which primarily infects salmonid fishes (trout and salmon), but can and does infect a much wider variety of finfish in both fresh and salt waters, *including* eels, striped bass, menhaden ('mossbunker') several kinds of flatfish, & others. In addition, it may infest (if not infect) shrimps, crabs, crayfish, mussels, clams, and even microscopic worms called rotifers.

IPNV has no health consequences to humans, whether directly or indirectly ingested.

This virus is *worldwide* in distribution, found on virtually every continent except Australia and Antarctica. In the U.S., many Eastern and Midwestern States have IPNV in their waters, especially through the Appalachians, Ohio, Pennsylvania, and the Northeast.

Viral transmission occurs in several different ways. Vertical transmission occurs from infected parents to offspring because the virus is present in large amounts in the fishes' reproductive fluids. "Horizontal" transmission occurs when fish ingest contaminated waters and/or foodstuffs. "Vector" transmission can take place by the introduction of contaminated nets and equipment to 'clean' environments. Because this virus is able to withstand the acid of digestive-system passage, a wide variety of both avian and mammalian predators and visitors to watersheds are also "horizontal" vectors via their droppings. In fact, visiting waterfowl may be the biggest 'culprit' in spreading disease. Unlike most viruses, IPNV can survive for extended periods in moist environments *outside a natural host* (up to 4 months) This very tenacious "bug" is also highly resistant to iodophors and ultraviolet light frequently used as 'disinfectants'.

The virus is mostly lethal to young fry, especially those under 5 grams in weight. Survivors of the initial infection, once old enough to be immunologically competent, usually are able to feed and grow normally, but become chronic carriers and 'reservoirs' of virus. Also unlike most epidemic diseases, when IPNV is introduced into a watershed it behaves as a so-called "point-source" epidemic, rather than a "propagative" one—that is, a great number of fish fall victim all at once, rather than the affected number increasing over time.

Once established in a watershed, the virus becomes *endemic*, with periodic outbreaks followed by periods of relative quiescence. There is also significant seasonal variability in measured viral concentrations in the affected waters. Reduction of the virus from a watershed is mostly a matter of hope that by reducing the fish population, the viral "load" will attenuate over time. However, this does not take non-piscine hosts into account.

Fish farms and hatcheries are particularly prone to disease, because in their crowded conditions only about one-one-thousandth of the amount of virus needed to infect a free-swimming adult may suffice to infect a crowded fish tank or other enclosure.

THE CRSPP HATCHERY

The 19th-century hatchery sits athwart the Connetquot river in such a way that the stream essentially flows directly through the hatchery complex. There are 11 holding 'ponds' in addition to the 'hatch house' where fertilized eggs are incubated. Ponds are netted-over to keep out predators or waterfowl. Nine of these are concrete-walled, gravel-bottomed enclosures with natural ground-water spring seeps. This makes them presently impossible to 'dry out' and/or disinfect. All the ponds ('raceways') are supplied exclusively by river-water. Only the hatch-house itself has a *potentially usable* well-water supply.

One of the raceways is open at its lower end to permit fish to access it from the lower river. Trout which have been imprinted from birth with the distinct chemical signature of the river but which have 'gone to sea' into the Great South Bay and survived to maturity will return at spawning-time to this pond. Thus, over many decades, the CRSPP hatchery has been able to utilize these uniquely robust fish to improve the genetic patrimony of their fertilized eggs.

Egg-rearing technique has altered little in over a century. It is a far cry from the semi-automated systems in use in modern facilities, and natural mortalities are far in excess of those occurring in up-to-date hatcheries. Nonetheless, the survivors have been vigorous and plentiful. The operation has therefore been both a boon to the fishery and a historical window for the visiting public.

It is clear that, as an integral part of the river itself, water quality will inevitably determine the success or failure of the hatchery operations. Therefore, maintenance of the existing hatchery 'design' cannot succeed in raising IPNV-free trout unless & until the viral 'load' in the river has dropped enough to be lower than that which could be expected to infect newly-hatched fry.

What is less clear, but of even greater import, is that even if the hatchery could be completely re-built to utilize a closed, well-water supply, the river course below it could not 'handle' the huge increase in flow volumes which would result (that is, regular river flows *plus* hatchery effluents.) Any new or substantially-new construction would not only be subject to difficult siting issues, but would be subject to 'modern' permitting/water quality issues, endless red-tape, and enormous expense at a time the State is in dire economic straits.

THE NYSDEC'S ROLE

Following an outbreak of *Viral Hemorrhagic Septicemia* in lakes Ontario and Erie, NYSDEC promulgated a set of "emergency" regulations (see part 188 of the NYSDEC regulations) requiring an annual fish health inspection certification. Without such certification, no fish could be sold, transported, or stocked in State waters. The obvious intent was to minimize, to the extent possible, the introduction of serious fish diseases into watersheds, especially those currently free of such diseases.

Seven different possible epidemic diseases of fish were listed in the regulations. By lumping all of these diseases together, the authors of the regulation made no provision for their differing epidemiologies.

Curiously, three "exceptions" were written into the law: A) the marine and coastal district, B) border waters between NY & neighboring States, and C) "subject to a permit which may be issued by the Department at its discretion". However, despite what any ordinary reader of this language would understand its meaning to be, NYSDEC has continued to insist that provision B was intended only to allow fishing tournaments to take place on border waters, and provision C was intended *only* to permit the stocking of walleye fry at very early stages of development. This begs the question: if the intent was specific, why was the regulatory language not equally specific? This putative lack of authority meant that the Area One DEC. (L.I.) fisheries had no ability to treat the CRSPP situation with "discretion".

Following the IPNV discovery @ Connetquot, NYSDEC undertook electrofishing surveys in the Carmans River and in the Nissequogue River. Neither stream tested positive for IPNV. This was a relief to those concerned with the native brook trout of the Carmans, brook trout being the salmonids most vulnerable to IPN. The Nissequogue had for decades received stocked trout raised in the Connetquot hatchery. When it was tested in 2008, no Connetquot trout had been planted there for some months, so the fish tested were likely from other sources. Nevertheless, the negative testing suggested that IPNV had not become endemic to the Nissequogue.

Electrofishing surveys in the Connetquot, however, revealed a very high prevalence of IPNV-infected fish, including the native brook trout in the upper reaches of the river. Some eels were tested and found negative for IPN, suggesting that the original source of infection was not of marine origin. This was further reinforced when the serotyping of the yearling trout harvested in 2008 revealed the viral type to be that which 'commonly' affects freshwater hatcheries.

All testing done by NYSDEC to-date has been on fish. No invertebrates, especially amphipods, have been sampled or tested, presumably for lack of funding. This is unfortunate, because a large invertebrate host reservoir of IPNV *may* exist in the Connetquot.

Although NYSDEC does not operate the CRSPP hatchery, it is the permitting authority. Consequently, NYSDEC insisted that any renewal of a permit would be conditional upon OPR-HP obtaining the services of a NYSDEC-approved hatchery engineering & management consultant to make recommendations for the mitigation of the IPNV problem.

During the closure of the hatchery, NYSDEC offered to supply OPR-HP with *some* stockable trout, but only to the extent compatible with a "Catch Rate Oriented Trout Stocking" survey to be conducted in summer, 2009. This survey is designed to assess what DEC considers a suitable & sustainable trout stream population, consistent with a catch rate averaging *one trout every two hours*. Any trout in addition to this would have to be provided by

OPR-HP at its expense. At the same time, however, DEC has forbidden any supplemental feeding of stream-resident trout out of concerns for nitrate pollution. Since all “beats” at CRSPP do not have equally-sustaining habitat, this will inevitably result in fewer “productive” beats for visiting anglers. This is of particular concern for handicapped-access beats, most of which are located immediately upstream from the hatchery, where an absolute stocking ban has been in place since 2007.

It should be noted that NYSDEC has indicated its willingness to permit a limited experiment in raising some trout as a method of indirectly testing the present quality of the river waters, provided any positive IPNV test will precipitate the prompt euthanization and disposal of such fish. This would also allow *some* use of the facility for educational purposes only.

To date, all attempts by concerned citizens, and even State Legislators, to elicit the active involvement & consideration of NYSDEC Commissioner Alexander “Pete” Grannis have been rebuffed, or met with stony silence. This has unenviably dropped the “hot potato” of the CRSPP hatchery closure entirely into the lap of the local Area One DEC personnel.

OPR-HP

New York State Parks is the steward of Connetquot. The Long Island regional director has delegated the IPNV problem at the park to subordinates, and has never acted as a public advocate for its defense. No visible intercession with the State Parks’ Commissioner on behalf of Connetquot has come to our attention. Many letters written to Commissioner Ash by concerned citizens have received only the most insipid and uninformative responses.

Certainly, the State’s economic hardships have played a role. But when all Parks’ regions are under similar constraints, common sense dictates that scarce resources are likely to be distributed according to the “squeaky wheel” scenario. When no clear effort is being exerted in defense of what they themselves describe as a “jewel” of the system, it is reasonable to suspect that some other motivation(s) may be playing a role in their behavior.

The subordinates who have been charged with handling the Connetquot problems are well-intentioned. Unfortunately, they have apparently neither the time, nor inclination to familiarize themselves with the scientific literature regarding the biology and epidemiology of IPN. As a consequence, they are in the “passenger’s seat” rather than the “driver’s seat” during discussions with NYSDEC and/or consultants.

This has also contributed to the “non-progress” to date. Granted, there are difficult bureaucratic obstacles to be negotiated. But their lack of *independent* knowledge about this disease renders Parks subject to relatively unquestioning reliance upon outside influences. Both the Friends of Connetquot and the Idle Hour Fly Fishers have submitted several scenarios under which the necessary data collection(s) could be advanced, but Parks has been unwilling or unable to take it upon itself to act independently.

In short, much valuable time has been lost owing to the glacial pace at which Parks has attended to its own “turf.” It (OPR-HP) has been, in our opinion, entirely too willing to play the victim instead of the controlling authority. In the interim, Park fishing attendance is off tremendously, the State is losing revenue at a time it can least afford it, the hatchery’s educational function has been indefinitely lost, and its historic character has been placed in jeopardy.

CONSULTANTS

OPR-HP was directed by NYSDEC to employ one of two DEC-approved hatchery management consultants as a pre-requisite for any DEC consideration of renewing the CRSPP hatchery’s operating permit. Both HDR/“Fish Pro” and the Freshwater Institute were brought to CRSPP to view the place first-hand – the former in late fall 2008, and the latter in early spring 2009. Both were requested to submit action proposals from which OPR-HP would select a bid.

Eventually, the FWI of Shepardsstown, W.V., was chosen by Parks.

FWI has considerable experience in the re-engineering of hatcheries, the use of sophisticated partial-re-use water systems, rearing areas, holding tanks, effluent treatment systems, etc. They also have scientific staff who are quite knowledgeable about IPNV, some of whom have published papers in the scientific literature.

The CRSPSP situation, however, may be unique to them, in that the historic hatchery's design is so much a departure from that which is usually encountered. Preservation of this hatchery will be intimately associated with getting the viral titers in the entire watershed down to acceptable levels for rearing fry.

It is unclear at this time whether "conservative" measures involving reducing the trout population will suffice to reduce viral loads, especially in view of the invertebrate (amphipod) biomass of the river. Furthermore, it has already been pointed out that adding a pumped-water hatchery volume to existing river flows would overwhelm the stream's carrying capacity.

Lastly, it should be noted that FWI is *institutionally biased* in favor of sustaining wild fish populations and against hatchery transplants

Their original proposal suggested they could start their work by May or June, 2009 but because of financial difficulties in OPR, a late-September start, at the earliest, is contemplated—and that would be only for the most preliminary suggestions. The projected cost of actually instituting those suggestions could very well be prohibitive at this time, if ever.

A DANGER TO OTHER WATERSHEDS?

Both NYSDEC and the local chapters of Trout Unlimited, a national coldwater fisheries conservation organization, have expressed great concern that the presence of IPNV represents a grave threat to presently uncontaminated watersheds on Long Island. T.U. is worried that virally-infected fish from CRSPSP may make their way to other L.I. waters via the Connetquot estuary. In addition, there could be inadvertent spread via contaminated fishing equipment, and of course, the influence of avian vectors, most notably osprey & waterfowl.

Actual historical evidence, however, would suggest that those fears, while reasonable, may be a bit misplaced.

We know for a fact that no IPN existed @ CRSPSP in 1975, because in that year the Cold Spring Harbor fish hatchery, shut because of some disease, was re-stocked with Connetquot trout, and has remained disease-free since.

It is likely that the CRSPSP contamination occurred in 1980, because hatchery records reflect that year to have been one of particularly high fry mortality. Disease was not suspected at that time, but no good alternative explanation other than unusual water temperatures could be found. Remember that IPNV acts as a "point source" epidemic. This unexpectedly high fry mortality is in perfect concordance with a point-source outbreak. And, since the disease rapidly becomes endemic and mortalities thereafter are not consistently in the 50-80% range, this scenario makes perfect sense.

The CRSPSP hatchery had never been tested for anything other than *Myxobolus cerebralis*, or so-called "Whirling Disease" from 1980 until 2006.

Thus, for a likely 26 years, fishermen with felt-soled boots had constant access to the Connetquot and subsequently to other rivers such as the Carmans & Nissequogue, not to mention the storied up-state Catskill and Adirondak rivers. And during this time, Connetquot trout were regularly used to stock the Nissequogue at Caleb Smith State Park. Connetquot trout were regularly "going to sea" as well, and untold thousands of migratory waterfowl were seasonal visitors as well as resident to its waters --- And yet, no other Long Island watershed has been infected., as far as NYSDEC can determine.

It has also been shown, experimentally, that the intentional introduction of a virally-carrying trout into a 'clean' stream does not suffice to horizontally infect the other resident trout, owing to the dilutional effect of flow volumes. Nor does the literature cite any proven, controlled study quantifying the infection threat posed by one or more raptors or waterfowl. That is not to say it does not exist, but rather that the imported viral 'load' has not been quantified vis-à-vis any given watershed's water debits.

THE DREAM vs. THE REALITY

Ideally, the NYSDEC's regulations ought to be re-written in order to provide them *disease-specific* and *site-specific* regulatory authority. The "one size fits all" nature of the present regulations ignores the distinct epidemiologic differences of the listed diseases. And while containment is a laudable goal, it may be realistically impossible while neighboring and regional States are more 'tolerant' than New York about IPNV. It should be noted that IPN has become so widespread internationally that it is no longer listed as a disease reportable to the O.I.E (the world organization for animal health). It could also be noted that no animal or bird has yet been found which can recognize State borders or read a sign. Statistically, it is inevitable that more waters in NY will 'get' IPNV. All NYSDEC can hope to achieve is to delay its arrival as long as possible.

In the case of the CRSPP, the hatchery could have been permitted to continue raising a quite limited number of trout for downstream stocking only, while maintaining the upstream stocking ban. This may have permitted a gradual elution of the upstream viral reservoir while maintaining both its educational and productive character. Along with a disinfection regime for visiting anglers' footwear, revenue could have been preserved while allowing time and budgeting for a more definitive approach. Judging from the 26 years in which the virus *could* have been, but was *not* explanted elsewhere, we see no reason why this approach could not have been successful.

Unfortunately, we are where we are. A complete re-construction of the hatchery to a pumped-water facility is financially out of the question, historically inappropriate, and probably incompatible with the hydrology of the river. So, what measures could be *expeditiously* undertaken? We would propose the following:

First:

With the understanding that no fish have been stocked upstream since early 2007, begin an immediate water-surveillance program to measure viral concentrations over a period of a year.

This would entail the collection of at least two 5-liter aliquots of water from both the "feedwater canal" and the "deepwater pond" monthly and measuring the virus contained therein in terms of the standard of "pfu/l", or "plaque-forming units per liter". The months of October through April are of particular importance, insofar as rearing fry are concerned. In addition, at least one test should be performed on the well-head water available to the hatch-house. These sites represent the "final common pathway" of water for the hatch house and raceways.

Any results above 100 pfu/l *probably* preclude the use of the hatchery for *stocking* purposes, but not necessarily for strictly educational/demonstrative purposes (with the destruction & disposal of fish testing IPNV +ve.)

Results between zero and 100 pfu/l would suggest that sufficient elution of virus has occurred to make resumption of trout production feasible.

This surveillance could be done for an estimated cost of \$ 12,000 to \$ 13,000 .

Second:

Utilize the surveillance year to begin re-constructing the existing raceways. This would entail the placement of tile drains for the groundwater seeps, and either manufacturing all-concrete raceways or installing impervious plastic liners. This would be complemented by the manufacture & installation of effective sluice-gates.

Raceway re-construction would permit the effective de-watering, and disinfection in the event of a persistent or new disease occurrence.

Third:

Apply to the USDA for an investigational permit allowing CRSPP to obtain the Schering-Plough food-additive vaccine which is used in commercial salmon-farming operations outside the U.S. The company maintains this product is 85% effective against IPNV.

As an indirect test of water quality, we propose obtaining certified disease-free rainbow trout eggs, rearing them in the hatch house using whichever potential water-supply has tested lowest for IPN concentrations, and begin feeding the fry with vaccine-treated food when they reach the "swim up" stage. Upon transference to the "nursery", which is presently fed only by "canal" water, the administration of vaccine-treated food should be continued.

After transfer to the regular raceways is possible, the fry should be divided into two groups. One half of the fish should continue to receive the treated food, and one half should not. The fish should be held in two non-contiguous raceways, so that their water supplies are "in parallel".

Following a suitable rearing-period in the raceways, 'standard' 60-fish lots of trout should be harvested and sent for IPNV testing using 'pooled' tissue sample, in addition to which two 10-fish lots should be sent out for *individual* testing.

If both vaccinated and un-vaccinated groups test positive, the entire stream-management policy needs to be re-visited.

If either one or both groups test negative, then we would suggest repeating the study utilizing brook trout, which are more highly susceptible to IPNV. Should a repeat-study be fortunate-enough to develop disease-free brook trout from the un-vaccinated group, the logical next step is to test-raise both brook and rainbow trout with no vaccine administered in either hatch-house or nursery. This would constitute an "acid test" of water quality.

In order to gauge the effects of infectivity vs. egg & fry population density, we envision conducting a study whereby different hatch-house troughs contain different population densities, up to 150% of the rearing density expected to be needed for "normal" trout production. Granted, the fish produced could not be held in the troughs for as long as would be desirable, since the nursery pond cannot be fully compartmentalized, but the harvesting & testing of the resultant fry would yield valuable information about the resumption of theoretical production targets.

We believe this is a workable and reasonable approach which would re-open the hatchery for at least its educational value while obtaining valuable data for further evaluation.

None of the above recommendations would require the "hands -on" involvement of consultants, especially if one or more motivated graduate students in fisheries' sciences from local universities could be found to participate. Any longer-term hydrologic/engineering/biophysical issues cannot rationally be presented without an adequate "data set" from which to begin. At present, and without any background data, any potential remediation solutions offered will be purely speculative, and quite likely prohibitively expensive as well as incompatible with the OPR's mission of historic preservation.

Without a renewed and sustained public demand for action, the wheels of State bureaucracy will continue to grind with agonizing slowness. Regulations written by bureaucrats are not biblical commandments; they can be re-written to be compatible with both science *and* the common good. Administrators cannot function efficiently if they are unwilling to educate themselves about the problems they are charged with addressing.

The ultimate nightmare for the Connetquot Preserve would be the exchange of some (limited) development for revenue. Under a former State administration, this idea was briefly floated, during relatively *good* economic conditions, but fortunately rejected. It is not at all unreasonable to speculate that under the current economic climate, a renewed push for such an exchange might be met with a more favorable audience. If OPR-HP does not act quickly and decisively to defend its "jewel", the gem may be stolen from under their noses.