

Rivers of Riches

Since 2000, BC Hydro has received dozens of small hydroelectric generation proposals. Fourteen are now producing electricity. BC Hydro has signed Electricity Purchase Agreements (EPAs) with about sixty of them, totaling nearly 1500 megawatts (MW) of generating capacity, about an eighth of all provincial generation. And there are many more proposals to come.

The largest small hydro plant in service so far is Rutherford Creek, just south of Pemberton, capable of generating 50 MW. The largest project is Plutonic's East Toba River and Montrose Creek Hydroelectric Project, consisting of two interconnected hydro plants totalling 196 MW. On the micro-hydro end of the small hydro scale are numerous schemes under 10 MW. The smallest, at only 0.2 MW, is also the cleverest, West Vancouver's Eagle Lake. These are not the massive dam and reservoir projects of BC's "heritage" systems such as the G.M. Shrum generating station where the Peace River now begins, capable of pumping out more than 2700 MW at full throttle — by itself a quarter of BC's capacity.

But what these new projects don't have in size, they make up in sheer numbers. They are making it up in intrusions into hundreds of undeveloped areas with roads, dams, pipelines, temporary construction camps, and a permanent spiderwork of transmission lines. They are making it up in dozens of issues affecting communities and local governments. And they are more than making it up in creation of phenomenal wealth that will transfer from the pockets of British Columbia's electricity users and run straight into the hands of company shareholders.

All is not well with small hydro in BC.

"Run-of-River"

Small hydroelectric generation projects are often called "run-of-river." The World Bank provides a definition: "... developments where no or little impoundment takes place and the natural river flow is utilised with no seasonal regulation."

The term implies more than this, however. Run-of-river implies that no dam is being built, when in fact a significant river barrier is constructed. It invokes an image of an innocuous generator suspended in an otherwise untouched stream, like a float on the end of a fishing line. Not so. Run-of-river is a term used by industry and government to avoid concerns, much in the way the phrase "clean coal" is used to greenwash coal, and "natural gas from coal" is used instead of "coalbed methane" to defuse public aversion.

As the illustration shows, water is diverted out of a stream, into a penstock, through a generation turbine installed in a powerhouse, and then returned to the stream. For the length of the penstock, often many kilometres (Plutonic's East Toba penstock will be about

Plutonic Power Corporation is one in a recent battery of companies in British Columbia flooding BC Hydro with small hydroelectric generation projects. Arthur Caldicott takes a wide-ranging look at small hydro and the issues that arise from its proliferation in BC. Plutonic's East Toba River and Montrose Creek project provides a fascinating case study illustrating the issues.

RUN OF RIVER



4.5 km), a considerable portion of the stream water is in the penstock, not the stream bed. “Out-of-river”, “beside-river,” even “really-close-to-river”, but not instream “run-of-river”.

All small hydro projects require a dam. It is more often called a weir, but the words are synonymous. Intake weirs are frequently a combination of a concrete dam and retaining walls, topped with an inflatable rubber barrier. Plutonic is proposing weirs six metres high, fully inflated, on the East Toha and Montrose sites. These are modest. At the McGregor/Herrick project, a dam 77 metres high is proposed on the McGregor River, about 120 km northeast of Prince George. That’s a pretty big dam, arguably more in keeping with the 184 metre W.A.C. Bennett Dam that houses the G.M. Shrum generating station. And while so-called run-of-river hydro projects have no storage by definition, the Hystad Creek project licence was issued with a storage component as well as the standard diversion permit.

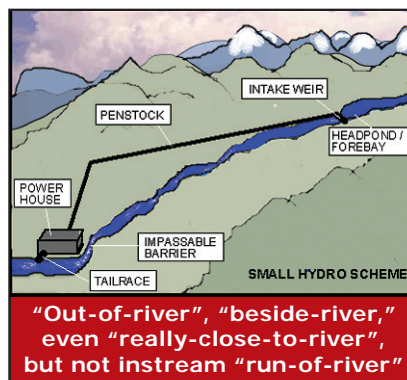
“Run-of-river” is great marketing, but it ain’t strictly true. Keep that in mind.

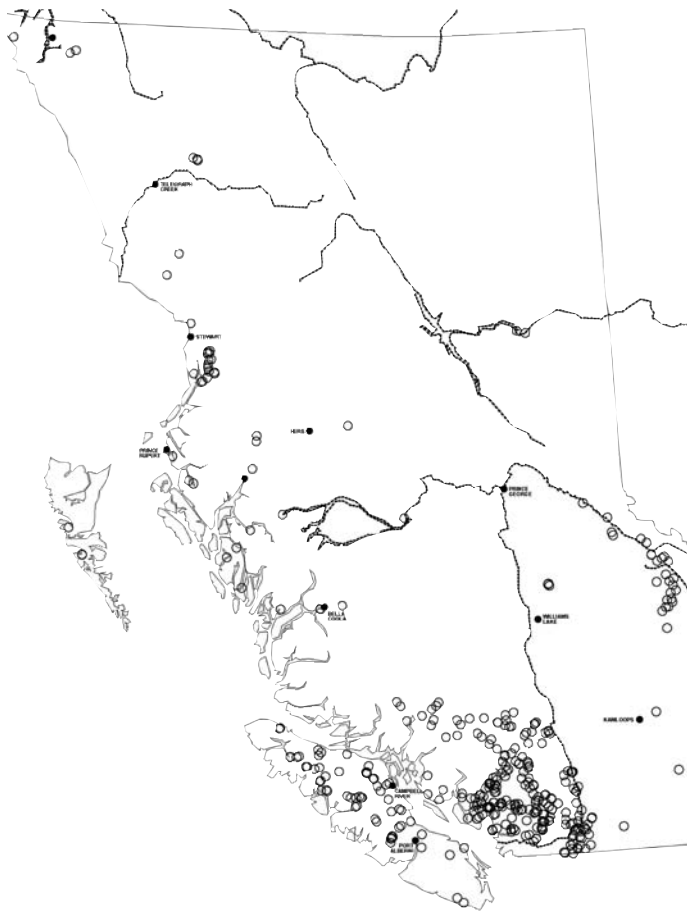
Water Licences: from Trickle to Flood

Rights to use water in a lake or stream are available from the Water Stewardship Branch of the Ministry of Environment. Rights holders are allowed to store, divert or extract water, and use it in a myriad of different ways. There are at least seventy types of licence, including, for example, “Bulk shipment of water by marine transport vessels.” (none issued, apparently, but the licence category is there, biding its time.)

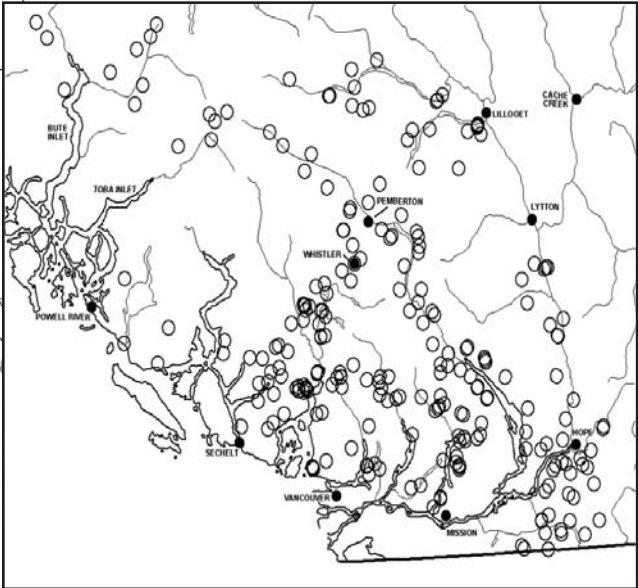
Until 1999, there were fewer than 250 “Power-General” licences issued, most of them to BC Hydro. Licence applications dribbled in at four or five a year.

In 2000, the quiet Power-General category went crazy. 365 new applications for these licences have been filed since then – more than 60 a year! These are almost all merchant Independent Power Producers (IPPs), only five from BC Hydro. Hydromax Energy has 38 licences. Plutonic is second with 30. Alpine Power and Cloudworks Energy have 28 each. These four comprise a third of the recent IPP licenses applied for.





**Power-General Water Licences
Ashcroft, New Westminister & Vancouver
water districts to September 2006**
Data obtained from:
Ministry of Environment, Water Stewardship Division
Integrated Land and Resources Registry (ILRR)
Land and Resource Data Warehouse (LRDW)
Map assembled by Arthur Caldicott



**Power-General Water Licences
ALL-BC, inclusive to September 2006**
Data obtained from:
Ministry of Environment, Water Stewardship Division
Integrated Land and Resources Registry (ILRR)
Map assembled by Arthur Caldicott

↩ *Run of River continued*

Follow the Money

Why are water licenses being applied for now in such numbers? As you might expect, it's all about the money.

The 2002 Energy Plan told BC Hydro to buy new power from IPPs. Consequently, IPPs are pitching BC Hydro with projects. Once an IPP has an EPA with BC Hydro, it has a risk-free stream of revenue for twenty or thirty or forty years. It is revenue that easily covers all the costs – water rents, cost of borrowing, construction costs, operation, maintenance & taxes, and leaves tens of millions of dollars of profit annually that goes straight to shareholders in the IPP. What's not to love about that, if you're an IPP or a shareholder?

The application for a water licence will cost \$5000 for a project up to 20 MW generating capacity, and \$10,000 for projects over 20 MW. Companies suggest that applying for a licence is comparable to staking a mining claim, or acquiring a drilling licence. This is not the case, for at least

two important reasons.

First, with both mining claims and drilling licences, the purchaser acquires underground rights to a very uncertain resource. There's a risk, sometimes a very expensive one, of discovering that there is no valuable mineralization or natural gas. With a power licence, however, there is no risk. The river is fully exposed, often with flow records that go back decades. The provincial government and BC Hydro have created water power guidebooks – how-to manuals - for getting into the small hydro business in BC.

Second, mining claims are issued for a nominal fee, as are water licences. With mining claims there is a somewhat valid defense that there is much risk attached to exploring for minerals, whereas there are no risks for water licences - the market value of a \$10,000 water licence is known to be tens of millions of dollars a year. Drilling rights, on the other hand, are sold by auction, and in theory fetch as much for the public accounts as the market deems them to be worth at the time of the auction.

POLICY ISSUE: The method by which water rights for power generation are issued does not serve the greatest public interest and needs to be reviewed and overhauled.

The only real "risk" issue for small hydro developers is if, or when, they will get an electricity purchase agreement with BC Hydro. It's that EPA that makes the water rights worth money.

Glossary

EPA	Electricity Purchase Agreement
IPP	Independent Power Producer
MAD	Mean Annual Discharge

When the EPA is approved, investors and lenders will be at the IPP's door. The EPA guarantees a long-term risk-free revenue stream to the IPP and its shareholders. It's not so generous to the public treasury.

And it's not very complicated. An example 100 MW small hydro IPP can produce at capacity all year, so its annual energy production is 876,000 MWh.

Revenue from BC Hydro (\$88/MWh):	\$77,088,000
Water rent capacity charge:	\$ 362,000
Water rent energy charge:	\$ 3,803,164
Net:	\$72,922,836

The real world isn't quite so simple, but that's the essential spreadsheet.

Two factors moderate this apparently outrageous profitability.

One, BC's streams for the most part don't flow at a continuous rate. They fluctuate wildly through the seasons and with the weather, from way above "mean annual discharge" (MAD), a calculated flow value used to characterise a stream, to substantially below it. Projects are never configured for a continuous rate of generation through the year.

Two, the IPP has to build and operate the project. Capital costs will be amortized over the life of the EPA. Payback of capital and interest, as well as operating and maintenance costs (perhaps 2% of capital costs) and taxes are all necessary costs.

Plutonic estimates that for its 192 MW East Toba & Montrose project, with its 35 year EPA with BC Hydro, costs will be \$450 million, annual revenues will be \$63 million a year and its annual "equity cash flow", or profit after these expenses, will be about \$20 million

That \$20 million annual revenue stream is pretty attractive. But it's nothing to what happens at the end of the EPA term. After the 35 year term has expired, Plutonic will

own the project infrastructure outright. It will continue generating power for perhaps another 70 years, with no capital payback and at minimal operating and maintenance cost. And the power will be sold at market rates.

What does an IPP bring to the deal? It assembles the project and commissions the detailed hydrology and engineering studies required. It is real work and someone has to do it. But it's not rocket science. There's no magic. The IPP contribution is simply not in keeping with the rewards to the IPP.

There are other ownership models to generate and provide new electricity for British Columbians. Many suggest that the province should retain the water rights and full ownership of these projects, and let BC Hydro contract out the work an IPP does today.

POLICY ISSUE: The rate of return to an IPP for its role in generating electricity may be excessive in comparison to the contribution the IPP makes to earn that rate of return. Also, the role of the IPP may not be in the best public interest, compared to other ownership and business models that would achieve the same result in terms of provision of electricity.

Bill 30 - Province Overrides Local Government

The 2002 Energy Plan confirmed in policy the BC government's intent to bring to an end the role of BC Hydro in building and owning new generation facilities, forcing it to acquire electricity from independent power producers.

In the spring of 2006, the government then cut local government out of the process. "Bill 30" removed local government's jurisdiction to disallow energy projects by means of zoning on Crown land.

Yet even to the end of 2006 small hydro projects have not caused a lot of local concern in most of BC. A look at the map suggests why: most of these projects are concentrated in the southwest of the province. Here we find the best rivers, close to transmission lines and to BC's major electricity load centre.

The Squamish-Lillooet Regional District (SLRD) is ground zero for small hydro. It encompasses most of the first projects to be built and is the first local jurisdiction that has had to deal with a myriad of different issues relating to small hydro. The SLRD is also the first place to attempt to bring the diversity of local concerns into a coherent policy.

Nowhere have local aspirations and corporate presumption collided in such acrimony as they have with Ledcor and its Ashlu Creek Green Power Project. The Ashlu joins the Squamish River about 35 km north of Squamish. It is immensely popular with whitewater kayakers, backroads



The Eagle Lake micro hydro facility is owned by the West Vancouver municipality. Water flows from Eagle Lake through an underground pipe and into a large storage reservoir, prior to entering the drinking water distribution system. A local resident suggested that power could be generated as the water flowed from the lake to the reservoir. A Pelton turbine was installed and commercial operation began in May 2003. The Eagle Lake micro hydro project has a capacity of 0.2 MW and will generate approximately 1.2 gigawatt-hours of electricity per year.

Continued on Page 11 ⇨

⇐ *Run of River continued*

adventurers, off-road hikers and cross-country skiers, not to mention people who live in the area who simply value it as it is – a non-industrialized wild stream. There also remains a concern about the area’s importance and vulnerability as grizzly habitat.

Responding to these values, the SLRD denied a rezoning application by Ledcor for the Ashlu project in January 2005. The application was resubmitted by Ledcor in December. The board decided to defer a decision pending completion of a regional energy/IPP strategy facilitated by the provincial government.

After that, the axe fell. More correctly, the provincial government brought the axe down on the SLRD and on all local governments in BC, removing their ability to control energy projects by zoning on Crown land within their jurisdiction.

POLICY ISSUE: British Columbians are not well served by senior government that overrides local concerns and implements policy that disregards the interests of communities. Small hydro projects are likely to appear in great numbers in many regions of the province, and it is appropriate that they be built in accord with local priorities.

First Nations

Small hydro projects just about anywhere in BC are within the traditional territory of one or more First Nations. A proponent must consult with those First Nations with se-

How to duck an environmental assessment

In British Columbia, energy projects are reviewable under the Environmental Assessment Act (EA). It is a time-consuming and costly undertaking for a company. An EA requires more disclosure of details of a project than some companies might want. While a company doesn’t face much risk of having its project not being approved – there have been no rejections in the entire ten-year history of the Environmental Assessment Office (EAO) – companies will avoid an EA if they can.

The easiest way to avoid an EA for an energy project is to make it small enough that it comes in under the threshold for reviewable projects. For energy projects, that threshold is 50 MW.

That’s why we get small hydro projects like Ashlu Creek (Ledcor, 49 MW), Rutherford Creek (Cloudworks, 49.9 MW), Mkw’alts Creek (Cloudworks, 45 MW) and the original Compliance Energy coal-fired generation plant (49 MW). Deliberately designed to duck the threshold.

rious intent to listen, adapt and accommodate their interests. (Unlike the meaningless open-house charade that constitutes consultation with non-First Nations communities.)

Plutonic’s East Toba River and Montrose Creek projects are within the traditional land of the Klahoose First Nation (KFN), whose main community is on Cortes Island. The transmission line, running south to Saltery Bay, intrudes on the lands of the Klahoose, Sliammon and Sechelt First Nations.

Plutonic’s main focus of aboriginal consultation has been with the Klahoose, who expressed concern early on with the Montrose Creek part of the project. For good reason.

But first, let’s go for a flight. And while we’re at it, let’s pack an inflatable raft and some life jackets. And a camera. Don’t forget the camera.

Taking off from Powell River (or Campbell River, or Vancouver) we fly upcoast to Desolation Sound, snow-covered peaks of the Coast Mountains to our right. This is where George Vancouver was so disheartened in 1792 by the cold and grey and drizzle, and at yet another long inlet that inevitably would not lead to the Northwest Passage, that he captured his reaction to the place in the name.

We bear off to the east and fly 35 km into Toba Inlet, a classic west coast fjord. Then continue up the Toba River another 23 km to the confluence of Filer Creek which heads north, on our left. On the south we see signs of logging activity. But once on Filer Creek, we are entering a land where chainsaws, trucks and the devastations of man have yet to penetrate. We are entering wilderness.

About 8 km up Filer Creek on our right is Montrose Creek. The powerhouse will be built directly below us, just before Montrose joins Filer.

Another 10 km up Filer, we turn west into Headwall Creek. Right to the end. We are now looking at Francis Falls, dropping 650 m (2132 ft) down Headwall Canyon – ranked one of North America’s best waterfalls. It is named after Kathy Francis, a negotiator and former chief of the KFN.

This is a destination wilderness tour for Earth River Expeditions of New York, which conducts occasional summer sightseeing into the Headwall Canyon and rafting down Filer Creek and the Toba River to the head of Toba Inlet.

The Klahoose have been unwilling to enter into an accommodation agreement with Plutonic because of KFN concerns about the impacts of the Montrose part of the project on the wilderness values of the area and its impacts on the future of eco-tourism in the area.

Many of the comments from the public to the Environmental Assessment Office supported the Klahoose in its dealings with Plutonic. The KFN’s neighbours on Cortes Island, in particular, were unwilling to support the project unless it had support of the Klahoose.

For Plutonic, things got very tense. GE was consider-

ing investment in the project, and Plutonic's failure to complete an agreement with KFN exposed the project, and GE's investment, to a considerable risk.

At the end of September, Donald McInnes was asked by a reporter, "Is accommodation with the Klahoose essential?"

"Yes, but the Supreme Court has been very clear that First Nations do not have a veto on industrial development in rural Canada," said MacInnes. "There's a duty on us to consult, a duty on government to consult, and we've been doing that. We'll do every thing we can to get an agreement with them, but my goal is to build a project."

Also in September, Plutonic filed applications for three more streams up the Toba River – a strategy designed to give the company fall-back if Montrose didn't proceed and as future infill projects even if Montrose goes ahead.

Then on December 21, Plutonic announced that it had "executed a term sheet" with Klahoose in which the two key items are that "Klahoose will consent to and not impede, hinder or dispute the construction or operation of the Project," and in return "Klahoose will receive cash payments from Plutonic during construction of the Project and for the first 35 years after completion, and an annual royalty on revenue thereafter."

A good deal for Klahoose? That's for Klahoose to say. But for Plutonic, it's a tremendous deal.

East Toba and Montrose are going to cost justify the long transmission line to Saltery Bay. Once that is in place, Plutonic's other projects up the Toba, and at the end of Bute Inlet and Knight Inlet can be daisy-chained onto the same transmission trunk, and all the electricity that will flow from them is almost certainly not in the KFN agreement.

First Nations have agreed to similar terms with other projects: cash payments, or some modest revenue-sharing agreements, for 1% or 1.5% of revenue. The industry is coming to expect this as part of the cost of doing business.

But other First Nations are getting more directly involved. The Upper Similkameen Indian Band is a 10% equity partner with Compliance Energy in its coal-fired generation project in Princeton, demonstrating that First Nations' interests in IPPs aren't constrained to so-called green projects. The Kwoiek Creek project south of Lytton is being jointly developed by the Kanaka Bar Indian Band and Innergex.

Leading the way for First Nations is the Hupacasath First Nation of Port Alberni which brought the China Creek project into production (through its 72.5%-owned Upnit Power Corp.) and now has a second EPA for its Franklin River Hydro project.

The Hupacasath example is also one that municipalities should explore. There are obvious benefits to running your own power enterprise. You set the terms. You reap the

revenue, or get the power, or both.

Oh, yes, back up Toba Inlet. In a couple of years, wilderness seekers will have no difficulty finding their way. Just follow the powerline. Watch for the powerhouse. Don't trip over the penstock.

Bye-bye, wilderness. Hello, cash flow.

Transmission Lines

An energy project without a transmission system connecting it into the provincial grid is useless. It's as useful as a car with no road to drive on. It's convenient for the industry and government to speak about energy generation projects without giving the same emphasis to its necessary transmission infrastructure.

That's probably deliberate, a kind of legerdemain keeping our eyes on the generation and not looking at the transmission. A small hydro generation project has a relatively small impact on the land – a diversion wier, a penstock most often buried underground, and a powerhouse. But consider also that Plutonic's East Toba River and Montrose Creek projects include a 148 km. transmission line - running along hillsides all the way from East Toba River above the head of Toba Inlet to BC Hydro's small substation at Saltery Bay at the entrance to Jervis Inlet.

The transmission right-of way is a swath of land 120 metres wide, of which the middle 40 m. is kept clear of all but short brush, and the outer 40 m. shoulders are kept clear of any trees that could fall onto the transmission line.

That's a linear clearcut of 1,776 hectares or nearly 4,400 acres; a strip torn from wilderness that instantly undermines wilderness tourism values. Power transmission rights-of-way will not even meet the Visual Quality Objectives required of forestry companies in their logging operations.

Everywhere there's a small hydro project, there's a transmission line. Are overhead lines the only feasible transmission method? Or just the cheapest?

HVDC Light (high voltage, direct current) does present a viable alternative, albeit at a cost that may be significantly higher than overhead AC. In its submission to the EAO for its Forrest Kerr project, Coast Mountain Hydro stated that it would be using DC Light technology in its transmission system, which would allow for some lengths of the system to be underground or underwater.

A secondary issue with buried transmission lines is that leaks or breaks are difficult to detect and repair, but then most breaks are attributable to iced and sagging lines and falling trees – neither of which are risks with an underground system.

Project proponents and communities who have had time to think about this a bit have recognized the issues that

Continued on Page 24 ⇨

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transmission lines entail. The Squamish Lillooet Regional District saw the problems, and suggested one part of a solution:

“... We felt that the power producers (like Ledcor who have plans to develop several run-of-river projects) should be getting together and collaborating to build a transmission line that could move the power from a number of different projects and keep it away from the populated areas.”
– SLRD Chair Susan Gimse

POLICY ISSUE: Transmission lines have as great or greater impacts than the small hydro projects they serve. The issues – environmental, economic and aesthetic – with transmission lines need to be understood and public policy needs to be developed with respect to these issues.

Protecting Fish and Fish Habitat

Nothing about the environment in which small hydro projects operate is as vulnerable as fish and fish habitat.

Are fish and habitat protected?

We’ll duck a direct answer to the question because we don’t know. Discovering an empirically sound answer is a significant research project.

But we will venture into the subject recognizing that this is a province in which politics drives policy, economic interests trump the environment, and science always takes a back seat.

As the deluge of applications for water licences from 2000 on became apparent, some people in government real-

ized that its policies and its procedures were not up to the task of ensuring that fish and fish habitat were protected.

Two major guideline documents were commissioned.

The first, *Instream Flow Thresholds*, (Hatfield et al 2003), addresses the flow rates required in streams under varying conditions.

The second document details the information requirements related to fish, fish habitat, water quality and hydrology and is entitled *Assessment Methods* (Lewis et al 2004).

The two documents together put into place a framework for decision making, based on “an adequate assessment of fish presence and absence” and “an adequate time series of mean daily flows” in which protection of fish and fish habitat is the primary goal. It recommends rigorous conditions of operation for projects, with ongoing monitoring and reporting.

These and other related documents are available at the webpage entitled “Instream Flow Guidelines for British Columbia – Working Drafts.” (links in Bibliography)

Some guideline documents produced by the present government have been smokescreens, designed only to be pointed at as evidence that the government has listened to concerns and responded with a policy.

The fish protection guidelines developed for small hydro projects appear, on the other hand, to be serious about protecting fish and fish habitat. But the language of the documents is to “recommend;” the actual terms of a water licence are the result of “negotiation.”

The primary mechanism for protection is how much water must be left in the stream (the “instream flow require-

Plutonic Power Corporation

Plutonic Power Corporation was created in 1999 by Donald A. McInnes, a principal in a number of speculative mining companies. Until 2003, it was just another stock in search of its next promotion. It’s a common heritage among BC’s IPPs.

Knight Piesold, an engineering consulting firm, had been acquiring water power rights on some promising clusters of streams in southwestern BC. In 2003, Knight Piesold vended these rights, and the power cluster concept, into Plutonic.

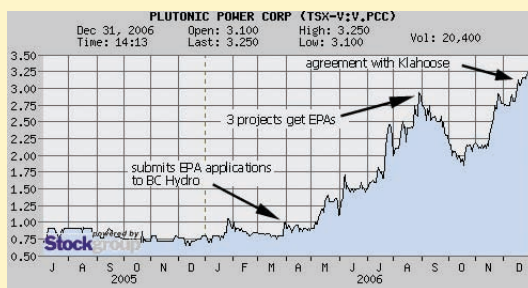
This deal would create lots of work for Knight Piesold as the Green Power Corridor – power projects at the heads of Toba, Bute and Knight Inlets (see map, page 9) – were rolled out.

In August 2006, BC Hydro announced that Plutonic was successful with two projects bid into its 2006 Call for Power.

General Electric (GE) then saw an opportunity. Plutonic would need construction capital and it would need turbines, both of which GE could provide - \$100 million in equity financing, \$400 million in debt financing in return for turbine sales, 60% revenue interest and 49% equity interest in the East Toba and Montrose projects.

It’s BC energy magic: two streams and \$20,000 in water rights applications have been turned into a secure, long-term source of revenue worth hundreds of millions of dollars for GE, one of the world’s richest corporations.

It has been a pretty good deal for Plutonic’s other shareholders, too.



ment”) and maximum diversion rates. Both are typically expressed as both a flow rate in cubic metres per second (cms) and a percentage of “mean annual discharge” (MAD).

Here’s an illustration of a flow regime for Rainy River on BC’s Sunshine Coast, another Plutonic project, and a fish-bearing stream with both freshwater and anadromous (sea-going, freshwater spawning) fish: “10% MAD year round except 100% MAD for 4 days in March and 4 days in April, 40% MAD in June and 25% MAD from September 15-30 and Oct.”

We can observe the negotiation first hand with Plutonic’s East Toba and Montrose projects

At low water levels, more water must remain in a fish-bearing stream than a fishless stream. A stream is regarded as fish-bearing unless it can be demonstrated that it is not, and persuasive evidence is required to have a stream considered fishless.

Fishless streams can’t be run dry, however. The guidelines recognize that these streams still have essential habitat value for fish that may be downstream and therefore have their own, lower, operating thresholds. As a minimum, the recommended instream flow requirement is equivalent to the median monthly flow during the low flow month.

The natural geology of the Toba Inlet drainage where Plutonic expects to develop the East Toba and Montrose projects, is a deeper central channel in which flows the Toba River, with “hanging valleys” from a number of its tributary streams. The East Toba River, for example, flows down its own valley, then drops into the Toba River valley. In theory that drop is impassable to fish. That is now supported by the data obtained by Plutonic. Nothing can get up the impassable barrier, and the East Toba is fishless in all its reaches above. The same is true of Montrose Creek.

Continued on Page 26 ⇨

Climate Change and Small Hydro

The rivers and streams at the far ends of most of British Columbia’s coastal inlets begin in watersheds covered, to a substantial degree, by glaciers. The Montrose Creek drainage above the intake location, for example, is 31% glacier covered; East Toba River is 36% glaciated.

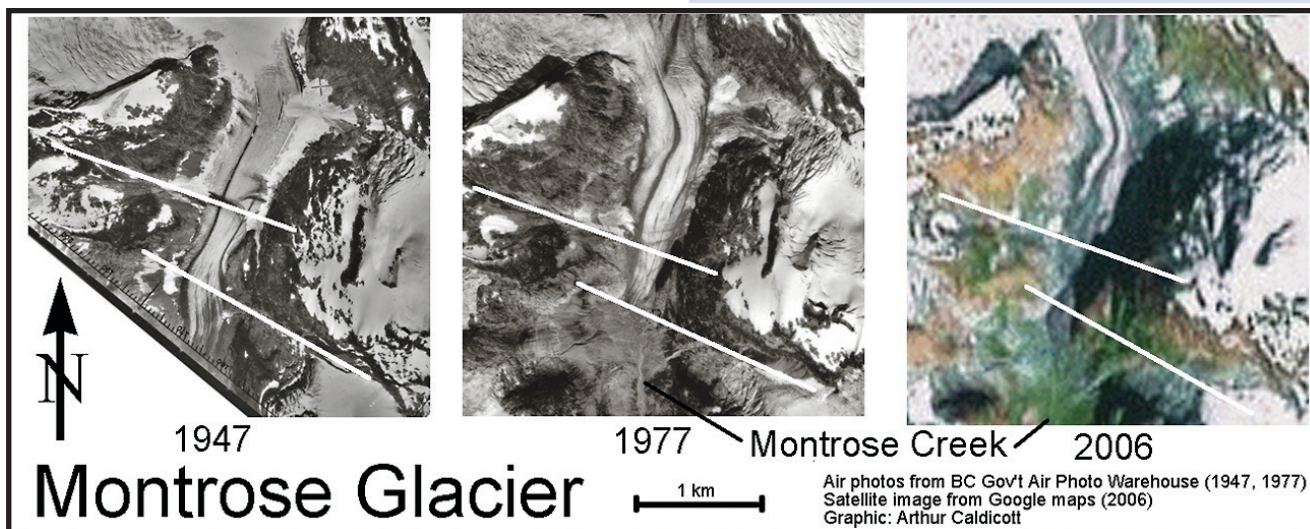
The influence of relatively high glaciation in these streams is most apparent in late summer. Snowmelt tends to keep flow levels higher than they would be if the stream relied more on rainfall.

Global warming accelerates the melt rate of glaciers, thereby increasing late summer flows and improving the generation capacity of the streams through the late summer.

Glaciers are in recession, however. Dr. Johannes Koch is a scientist at Simon Fraser University who has done considerable research on glaciers in southwest British Columbia, as well as elsewhere around the globe. His research in Garibaldi Park indicates that about 1700 AD, at the coldest point in the Little Ice Age, about 33% of the park area was covered in ice. Today, 300 years later, 38% of that ice has been lost.

Do these streams have a “best-before” date on them for power generation? Is it possible that the glaciers will be gone in fifty years, but that while they’re melting the streams are supercharged? Plutonic estimates that the design flow can be fully utilized approximately 27% of the year on East Toba River, and 30% of the time on Montrose Creek. Those numbers will decline precipitously once the glaciers are gone.

Dr. Koch is reluctant to put dates to any predictions, but says, “If we assume warming to stay the same as in the last 10 years, I would say that we probably see a significant number of glaciers in the southern Coast Mountains vanish in the 21st century. Rivers that are fed by a few individual glaciers most likely will see significant decrease in late summer run-off in the second half of this century.”



↳ *Run of River continued*

Plutonic had not persuaded the Ministry of Environment that the streams were fishless, nor was the company content with the proposed minimum flow levels of 11.2% and 9.5% of Mean Annual Discharge for the two streams. It wanted to halve those, down to 5% of MAD. It also wanted to raise the initial maximum diversion rates of 206% and 197% of MAD to 220%. Based on 23 year synthesized data record, the calculations showed that East Toba River would not have operated more than 11% of the time and Montrose Creek would have been inoperable more than 19% of the time over that period. Not enough for Plutonic. Every extra drop of diverted water is money in the bank.

More fieldwork was done to demonstrate the fishless status. With this new fieldwork, Plutonic again suggested that it should be allowed to reduce the minimum levels to 5% of MAD. Plutonic even suggested at this point that the "Larger instream flow requirements compromise project feasibility."

At press time, these issues had not been resolved. Ministry officials had almost accepted the fishless status, were not persuaded that lowering the instream flow requirement is justifiable, and had conceded the higher maximum diversion rate.

Environmental assessments may never stop a project in BC, but the transparency and disclosure requirements of an EA expose some of the inner workings of the process, and likely result in a higher level of scrutiny.

At 49 MW, Ledcor's controversial Ashlu Creek project ducks under the EA threshold. Is the same rigour being applied to the Ashlu, where the stream may be fish-bearing and where the politics are definitely at play? In the absence of readily available information posted for public review, as is the case with an EA, the public has little reason to be confident that the same high standards apply. And having seen the heavy hand of government already wielded in support of Ledcor's project, the public has little reason to trust the process.

POLICY ISSUE: The reviewable projects threshold should be set to zero, or near zero, for all energy projects. The people of BC need to see and have the opportunity to be part of the process in approving all energy generation projects in BC. Each stream and each airshed is its own habitat, has its own issues and its own specific conditions and needs its own thorough and transparent review with opportunity for public input.

If the Ministry of Environment guidelines for fish and fish habitat protection appear capable of achieving their goal, then where is the risk? There are still many.

- The ongoing monitoring and reporting require-

ments are all after-the-fact. The habitat could be irreversibly degraded, the fish could be dead, even before it is known that recovery steps are required.

- The government itself has no resources to monitor on its own; numbers could be fudged.
- Many of these small hydro operations are hundreds of kilometres from public view. A plant could simply continue to operate irrespective of the instream flow requirement, because of human error, laziness or greed. Who would ever know?
- Even if a problem is noted in time to do something about it, the company may object that increasing the instream flow requirement will threaten its ability to continue operation, and may sue the government.

But the likeliest threat comes from the provincial government itself, either by design, or by inaction. In 2001, the Liberals campaigned that it would pass a "Living Rivers Act" and develop a strategy for protection and restoration of BC's rivers. Since that time, nothing of significance (the 2005 budget assigned \$5 million to a river restoration trust fund) has been done to implement the promise.

The government betrayed the people of the Squamish-Lillooet Regional District with land use planning and Bill 30. It can just as easily betray the fish if river protection is seen to be interfering with its energy agenda. It doesn't even need to be overt: it's as easy as a staff reduction here, a budget cutback there.

Marvin Rosenau and Mark Angelo conclude their report, *Conflicts between People and Fish for Water* with these comments:

"The efforts to protect and restore our salmon and steelhead populations seem to be failing despite all of the passionate rhetoric. Notwithstanding some spectacular recoveries ... there is considerable evidence to suggest that fish habitat in British Columbia is undergoing slow-net-loss rather than no-net-loss."

With hundreds of new water licence applications for small hydro projects, "slow-net-loss" might be the best we can expect.

The Last Drop

From dozens to hundreds, rights to develop BC's small streams for power generation are being sold for a song to entrepreneurial companies seizing the brief window of opportunity – even BC has a finite set of rivers that have good power generation potential without building large storage reservoirs or doing great harm to fish.

The greatest beneficiaries of this feeding frenzy are not British Columbians; they are shareholders of the IPPs which own the projects. What makes it such a good deal for those companies, is exactly what makes it such a bad deal for citizens. It's the handover of what will ultimately be

RUN OF THE RIVER

billions of dollars from electricity ratepayers, money that previously would have gone to the public purse.

The hundreds of streams, all the wilderness, fish and habitat will be impaired by this new gold rush, even with diligent stewardship. The land will be overrun with a new and intricate network of transmission lines.

First Nations and communities have few options to exercise any local control, other than to become power developers themselves.

The same government which opened the window to IPPs, has closed it to the public interest of British Columbians.



The complete manuscript for "Rivers of Riches," with more financial and other details as well as a bibliography, is available for free download as a pdf at:

www.watershedsentinel.ca or
www.friendsofcortesisland.ca.

For a paper copy of the complete manuscript (approx. 30 pages), send \$5.00 to

Watershed Sentinel, Box 1270, Comox BC V9M 7Z8




Green energy and the BC Clean designation

BC Hydro is required to source half of its new electricity from BC Clean sources as a directive of the government's energy policy. But wood waste and even municipal waste qualifies as BC Clean energy fuels. Every small hydro project ranks as BC Clean, even if it annihilates every fish in the river.

As for green energy, BC Hydro requires that projects wishing to qualify for the green designation obtain EcoLogo certification from the federal government's Environmental Choice Program (ECP).

The ECP criteria for small hydro state that the project will not allow "the harmful alteration, disruption or destruction (HADD) of fish habitat", and that it operates such that reduced flows "are not detrimental to indigenous aquatic and riparian species..."

These criteria sound rigorous, but have no depth. The ECP "audit" is satisfied if a project has its provincial permits with respect to fish protection and minimum flows.



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