PENOBSCOT SCIENCE EXCHANGE

MARCH 5, 2010

UM Senator George Mitchell Center

Attendees:

Patrick Erbland, UM
Gayle Zydlewski, UM
Charlie Todd, MIFW
Greg Bean, MDEP
Blaine Koop, Penobscot Trust
Tara Trinko, NOAA
Mike Bailey, UM
Antonio Bentivaglio, USFWS
Josh Royte, TNC
Rob Hogg, UM
Wendy Warren, City of Bangor
Rob Mohlar, MDEP
Dave Courtemanch, MDEP
Steve Coghlan, UM
Alice Kelley, UM
Ian Kiraly, UM
Adria Elskus, UM/USGS
Mark Whiting, MDEP
Matt Deitert, UM/DSRRN
Merry Gallagher, MIFW
Melissa Laser, DMR
Jeff Reardon, TU
Christine Lipsky, NOAA
Steve Mierzykowski, USFWS
Karen Wilson, USM DSRRN
Barbara Arter, UM DSRRN
Oliver Cox, DMR
James Hawkes, NOAA
Graham Goulette, NOAA
Rory Saunders, NOAA

Penobscot Science Exchange

March 5th 2010

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9:10 – 10:30 Research Presentations

1. Merry Gallagher (MIFW) 'Status of Non-native Fish Species in the Penobscot'

NOTE: only showing MIFW data, not DMR data. Maps she showed do not include a lot of mainstem data from DMR.

Northern pike, SMB, LMB ~ triumvirate in Maine; considered sport management species in Maine

Others: black crappie, white catfish (new as of 2009), [goldfish, green sunfish, central mud minnows occasionally show up].

NP – of largest concern; spreading thru Penobscot drainage, both up/downstream, no limit on take- asking anglers to remove them. 1969 first appeared in Kennebec; now pretty ubiquitous in lower Ken & Androscoggin.

Pushaw Lake - radio telemetry project on-going; identified holding areas (Mags ledge) & spawning areas –remove and kill all they catch. 2005-6 was first iteration with 5 fish; now on 2nd iteration – 5 fish tagged, one dead so tracking 4 now – most spawn in Pushaw stream inlet at a specific bend – only one spawning area, surprisingly. Mags Ledge deephole at 24 ft deep is where the tagged fish hang out during the summer months. They are a cool water fish. Late March/early April are spawn trapped. Have found 2 fish that haven't moved from northern part of the lake, one in south, one is 'wanderer'. None of tagged fish have ever left the lake. See 12-14 fish removed per year, same intensity for last 4 years. Early in the invasion. Dam at Pushaw outlet is not a barrier except at very low flow. Some were caught in trap nets in outlet. Hoping this year will be a more normal water year to see where they go.

Have seen one potential NP/CP hybrid - caught in Pushaw winter 2009/2010 but eventually only see NP. One of first to spawn in spring; ice and high flow prevent gill net removal. Eggs vulnerable to siltation –but DEP permitting issues & only 2 week window. Water level cannot be controlled in Pushaw b/c of dam situation.

Seen in Kennebec, but not in Penobscot yet.

SMB – in system since late 1800s. No take limit in most systems; PIN has different regs in their tribal waters. They are a popular sport fish – so few opportunities for control, also too well

established. No size or bag limit on populations where bass are in conflict with native fisheries. SMB in tribal waters have different fishing regs. No bass in West Branch. They have 'legs' and haven't shown up there yet, but habitat is probably fine there for them.

LMB – in system since 1994. Never a management objective of MIFW so probably an introduction. Found in 24 lakes, 2 streams, a couple of ponds in PR drainage. Really has 'legs' – many are moved around by people. Under general law regs except for Snag Pond which has no bag or size limit. There are some in Penobscot River but not numerous. Piscataquis drainage – Silver Lake, Manhanic Lake, lots of recent reports. [Jeff Reardon wants to know why not an aggressive approach as towards NP?] Also Cold Stream [Steve Coghlan]

Black crappie – 1957 in Herman. Currently only in 7 ponds in PR drainage (documented). Doesn't seem to move much, very lake-centric, not in streams. Not popular sport fish. Where they are is probably due to 3 independent stocking events. No size or bag regs.

Central mud minnow – in Pushaw stream ~ 1998, probably accidental release from a bait farm upstream. Know nothing about its impact in Maine. Found in upper St. John – natural?

White catfish – in PR just below Chianbro site in Brewer. In Kennebec since ~ 1995. Not showing up in IBI yet. Normal range is south of here; pretty abundance in Kennebec below Augusta.
Green sunfish – private pond in Argyle in 1990s; rotenone treated – gone now. Are in Kennebec.

Goldfish – show up all the time in private ponds. Orono golfcourse/Bangor mall –rotenone treated and gone now. Illegal in private ponds in Maine. Gold fish show up all the time. Usually aquarium releases.

Spottail shiners– some seen in system, MIFW hasn't seen them. Are out there.
Emerald shiners – 1 or 2 places, but not in Penobscot. What about spot tailed shiners (a bait dealer is selling these), emerald shiners? [Steve Coghlan] – they have been picked up, here & there. What about gizzard shad in the Kennebec [Jeff Reardon]?

There is a state program for Invasives & Exotics, but still hard to control SMB.

Effects on diadromous fish restoration? – leaving Milford impoundment will ensure SMB stay there. If can get river herring back will be a double edge sword – will be prey buffer for salmon, but pike follow herring.

2. Wendy Warren (Environmental Coordinator, City of Bangor) 'Clear Streams Project and the Stonefly Resurrection'

Urban planning background. Goal: make sure Bangor complies with all environmental regulations, including stormwater; outside city's normal responsibilities.

Goal today: describe municipal efforts, relationship to research, big concerns, involvement of researchers.

Stormwater (SW) runoff – big concern for cities: chemical, biological, physical effects on streams. Expect this problem to grow. 5 streams run thru Bangor (Bangor has 5 impaired streams going through the city; probably more. Birch Stream (airport at headwaters), Penjajawoc Stream (Mall area), Pushaw/Cape Hart Brook (housing area), plus others), all impaired, all drain into Penobscot. Bangor is required to clean them up.

'Clear Stream Project' – stormwater problem is bigger > Holtrachem, WWTP, fish passage; but equal to the pharmaceuticals and personal care products (PPCP) issue. Requires behavior changes, paradigm shifts (people want wider streets, more pavement, but need to do the opposite to reduce SW runoff = need thinner streets with more grass & trees, swales in parking lots (rather than isolating trees & grass in islands in the middle of parking lots). → mind-shift is needed. Invisible commodity.

Involuntary municipal gov't are now on the front lines of stormwater management change – somewhat against their will because it requires education, which is not the usual role of the municipality. (also difficulties with dealing with private property owners – i.e., how d you tell them what to do). Problem is that people don't understand stormwater, which is a non-point source (so very difficult to address, in comparison to lakes, for example where it's a more contained system).

State places burden onto municipalities to set WQ goals thru TMDL reports, but no funding is provided for enforcement of the TMDLs, making it difficult to enforce. Burden falls on the municipality code enforcement officers. One exception is the Industrial Stormwater program ~ this is a self-sustaining (businesses pay for this themselves). WQ in TMDL and other permit requirements measured by 'bugs' (stonefly abundance) as indicators of stream health. A measure of habitat which in a way is more informative than level of pollutants. Very difficult for local businessmen to grasp why we need to save bugs – difficult to communicate. Also target baseflow (important because so low in summer), DO, vol, sediment, temp, nutrients.

Can control many aspects (toxics, flow, etc) but cannot control chloride (salt level). Could gravel and sand be used instead? No because gets ground up & becomes airborne + sand in stream is a problem. Putting together watershed management plans now.

Watershed management plans for Birch & Penjajawoc, and have several more to do; probably moving towards doing one big plan for the whole cite. Installed LIDs and have experimental non-traditional stormwater treatment systems.

Examples of what the city has done/is doing:
1) bypassed retention pond in Bangor Mall; 2) put in tree boxes to act as filter systems of SW before it enters street drains that go to catch basins; 3) put in bio-filtration systems along city streets (Biofiltration systems require space & require soils to be replaced when they get contaminated but are trying these out); 4) riparian improvement of Penjajawoc stream, will do plantings next spring; 5) Storm Tech system under parking lots (Bangor waterfront) to filter SW before it enters the Penobscot; 6) At the airport, need to deal with deicing which goes to wastewater treatment plant, but there is still deicing fluid outside the designated area; they have installed subsurface (no open water) wetlands to digest the propylene gylcol and other pollutants; windmills help aerate the water in the subsurface wetlands. Experimental floating island has been installed to shade the water & soak up nutrients. Experimenting with different types of plants. Air Guard is also using bacteria in the propylene glycol storage tanks to break it down. 6) Encourage rainwater harvesting in private homes, including rain gardens, rain barrels. Explained the need for ordinance changes (like grouped housing, which takes up less green space and builds less impervious surfaces). Green infrastructure, open spaces & buffers. (what is the value of greenspace vs. a new building). Ordinance changes, outreach, education, zoning.

Note: sub-surface filters work in winter, but surface biofilters may not work well in winter.

Educate: value in leaving green space; do we have to grow?

Listed needs for research (slide 20). Very good questions/ideas for research. (note: are not addressing direct inputs (outfalls) to the river..why not, I wonder?). Some of her research ideas were: Was the stream always a stonefly stream? Can you stock them? What is bad for the stoneflies (is it one big impact of salt melt?), (What effect does chloride have on stoneflies?) Are these bugs a good index of salmon recovery? Can we use bacteria or other shortcuts to monitor stoneflies? Should we focus only on streams that are recoverable (rather than spend money on all)? What about snow dumps from towns that don't have impaired streams but do have a direct drain to Penobscot?

Collaboration ideas: 1) grant writing, 2) PROPAC – association of businesses on river – organized themselves to respond to spills on the Penobscot. – perhaps river researchers could use some of their boats?

Q&A

How might impaired streams affect diadromous species restoration efforts? ~ Oliver Cox says diadromous species do use the Kenduskeag, which has impaired streams emptying into it.

How does Bangor work with adjacent municipalities? Will work more as expanding to new streams; Herman will take a lot of work; Hampden is already proactive.

3. **Rob Mohlar (Engineer, Environmental Assessment Division, MDEP) 'Water Quality Model for the Penobscot'**
   Impoundments from Millinocket down are difficult to model, with point sources as well.

   Extensive WQ surveys on the Penobscot (1997, 2001, 2010). In 1997 initial modeling efforts started – the Qual2E – one dimension modeling, fairly unsophisticated, original model calibrated reasonably well but in 2009 the decision was made to upgrade to a WASP model, in part because the 1997 algae bloom was not captured by the QualE2 model. Still issues with the data to populate the WASP model- data gaps along the river: lots of Noise above Matteseunk dam; below that point there are fairly consistent values of phosphorus. Above the dam, there are sharp spikes (point sources) but also dramatic drops immediately afterwards which are hard to model – way off published dynamics. The impoundments may have stratification issues that aren't captured in the DEP data (top ten feet only?). Chla has the same basic issues – dynamics outside literature value [possibly attributable to vertical stratification in impoundments. DO oxygen swings – perhaps due to benthic or rooted plants which aren't accounted for in the models (seems to confound the model the most). Biggest changes in the faster moving sections of the river – due to macrophytes/benthic algae that haven't been well quantified to this point.

   Goal of model is to establish discharge limits for point sources on the river – DO response to BOD loading. Conventional wisdom that it is all BOD loading that is causing the DO swings (and there is certainly BOD loading that causes problems) but something else must be going on because the model predicts, at max loading, DO levels that are above attainment standards.

   Suggests that it is more of a nutrient issues. Before 2007, P loadings were higher than should be. Post 2007, consent agreement with Katahdin West paper (Millinocket and east Millinocket) to reduce their P input into the river.

   Dolby Pond is one of the problem areas on the west branch. – shows a significant deephole that is likely short-circuited by the river flow through the impoundment – maybe a source of P through internal P cycling. In the qual2E model, Dolby Pond would be handled as a single black box; the WASP model allows multiple depth segments, lateral segments, etc.

Matteseunk Impoundments, Milford & Dolby Dam impoundments were surveyed for velocity profiles by USGS this past summer showing where the flow is going in the impoundments and indeed much of the flow in Dolby Pond bypasses the deep-hole area.

Expect to issue new discharge licenses in 2010 and will be collecting supplemental data in the Dolby-Weldon sections of the river in 2010. Ultimately the goal is to be able to predict the response to loading in the river.

How long is license good for? Generally a 5 year cycle –presently the licenses are significantly out of date.
Will new permits confound the Trust's work with the OT sewer outfall work going on this spring? [Jeff Reardon] – these should not affect the discharge amount, the issue is more of does the outfall meet the near-field conditions necessary?

RESEARCH UPDATES

1. **Josh Royte, TNC – Stream Connectivity Group; State stream connectivity committee–** Melissa Laser, DMR, and Slade Moored of the state planning office. Are co-chairs; 16 -17 organizations are involved; governor requested that this group form. There is a prioritization workgroup & data workgroup that are merging to maybe make a Google earth presentation of known data. One major recommendation to the Gov will be to have an actual river restoration program - so there is one place to go for folks to contact state agency folks about that. Melissa says Maine needs a state River Restoration Office; which would go beyond the DEP Dream Team. Involve State Planning Office? – have written the Governor but the SPO is coastal & this is a statewide issue. Perhaps should replicate the SPO structure.

2. Mark Whiting, MDEP – Water Quality Studies at Katahdin Iron Works

Salmon Rivers Program of DEP. He monitors WQ, including Penobscot. Is Katahdin Iron Works contributing to a potential problem limiting salmon #s in the Pleasant River? Iron mining/smelters still there; mines up on Ore Mountain on West Branch. Took WQ samples above/below Katahdin Iron Works & at Blood Brook (pH 4.5 – 6.6) (iron-stained; large iron deposits here) + samples taken of water leaving iron pits (pH 2.2). Lots of Al, Fe, Ni (lethal levels) but other metals absence. Never found a direct surface connection b/w pits and Blood Brook; thinks groundwater always had iron in it with low pH and Al probably always been high here (lethal levels likely). Doesn't think the iron pits the source of BB impairment. BB extremely impaired (via rock baskets) vs West Branch which is fine. No direct connections to Blood Brook from the iron deposits, but groundwater may bring low pH water to Blood Brook – perhaps

always the case. Not much living in the Brook now. Probably isn't causing problems for the Pleasant River. Look on the DEP website for a report on the Brook, but also a report on the area from the Maine Geological Society.

3. NOAA – Lower Penobscot Telemetry, Estuary Sampling, & Sedgeunkedunk Study

a) Hawkes, Kocik, Graham Goulette – Evaluation of AS smolt emigration dynamics of different rearing origins thru Penobscot Bay. For 2010 will compare 1+ fish at GLNFH and wild smolts using tagging – will evaluate performance through the telemetry array: survival, migration behavior, swim speed, diurnal use, tidal pattern use, etc. Will also test sentinel tags to assess how arrays are affected by ferry traffic, etc. Density of arrays is high (200 – 400 m apart, double arrays). Tag 150 fish with V9 tags & will try out V8 tags (50?) this year that are smaller . Receivers will be about 100 this year. Units will be Veazie & above, then into the bay – 120 (?) receivers from Veazie Dam down in total. 600 m between units; double lines to improve efficiency. Will be testing efficiency of arrays with sentinel tags to test detectability of tags moving through the array under different conditions that might compromise detection.

b) Mike Bailey – Joe & Mike projects: 50 receivers above Veazie & releasing tagged fish from several points: 100 fish released in Milo, 100 fish released in Passadumkeag, 100 fish above Weldon (wild fish) and some more fish released down river (?). Will also add acoustic tags to adult fish which have PIT tags as well. Radio telemetry array at Milford impoundment to see where the smolts go when they are moving downstream- allows fine scale tracking; at the Veazie dam radio telemetry as well (20 shad will be tagged). Let him know if you are using tags of any sort. Didsin device at mouth of Veazie dam to see if can see shad moving up to dam or not - Anne Groat grad student will be doing this. There will be receivers in the impoundments so watch out?!

   Alice Kelly will be dragging equipment through this area – they will coordinate.

c) Rory Saunders – (1) Penobscot Estuarine fish community structure study, new for 2010 - preliminary sampling will occur in summer 2010. Lack of baseline info in this area, particularly from Hampden to Islesboro. Hope that this will become a long-term program, will intensify their sampling in 2011. This summer will start simply, using beach seines, traps, simple sampling scheme. Idea is that they will have gear out there, so if you need live fish, let Rory or Christine know (for tagging, isotopes, genetics). 2) Sedgeunkedunk Project: expect that alewives will reach Field Pond this summer for the

first time. There will be a weir in place at the top of the rock ramp to count fish this year.

4. Barry Mower, DEP – WQM Above Lincoln

   Dave Courtemanch spoke – have conducted fish physiology studies in PR for several years (gonad, liver, intersex, endocrine endpoints (VTG, T, E2) – waiting for 2009 data (West Branch from Mill down to Mattaseunk dam). Have had conflicting results over the years for this section of the river (below Millinocket), are trying to verify by doing additional sampling. White suckers, SMB studied. Mierzykowski also working on these endpoints for SMB above Milford (Lincoln & Costigan).

5. Karen Wilson – alewife & blue back herring stock structure study in lower part of the state, joint USM- GMRI project. Continuation of genetics work. No tagging this year, in 2009 tagged 10-20 of them. Note that acoustic tagged alewives were tracked into Penobscot Bay last summer so that tagging method was successful.

6. Jeff – PRRT update – waiting for FERC to issue final environmental assessment. Dana Murch at DEP has drafted permits for after the EA comes out. GW dam removal will occur in 2011. In-river work for 2010 (Mar-Apr) working with Redshield/etc on their water intake. Veazie removal will not occur until GW removal is complete; earliest removal would be 2013. Nothing is driving the timing for Howland work; complications at Howland: DOT is replacing a bridge & EPA-DEP funded clean-up of tannery site is slated for summer 2010.

RESEARCH COORDINATION

1. BSA –
   a. creating a newsletter 'Penobscot Watershed Annual Newsletter' that will be a summary of abstracts. Up to you what you wish to contribute. Primary purpose is to get your research out there. Targeted at agencies, university researchers, etc.
      3 categories: in progress, preliminary data, published data.
      Primary purpose is not out-reach, but to share info with colleagues.

      Submit abstracts by April 15th . Note that abstract should include several things, including status, funding source, more information link, attaché a small photo or graphic

      Will send an email about this to gauge interest.

b. Northeastern Naturalist – passed an issue around. Quarterly. But also Special Issues put out. How about a Special Issue for Penobscot Research? We need to raise our own money to do this ($25- 30K). Electronic version nearly the same cost.

   Will send an email about this to gauge interest.

2. Karen Wilson
   a. 1st DSRRN Workshop: Resilience in the context of Restoration. 15 experts invited to come in and work on a synthesis paper. Cannot accommodate on-lookers, but may have a couple of positions for those who want to help with the workshop.
   b. Multi-disciplinary Study Committee – point is to put together a multi-disciplinary NSF proposal for long-term study in the Penobscot River because there is so much background data on the river at this point. See Gayle or Karen if interested. Significant effort requiring at least 4 committed people. Would go in a year from now most likely.

3. Melissa
   a. Meeting going on now at Fisherman's Forum at Samoset in Rockland this weekend.

4. Gayle
   a. July 10th Penobscot River Revival. Bring your science to the people who might appreciate it. Get in touch with Christine Lipsky if interested.