STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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COMMISSIONER

April 5, 2004

Senator John Martin, Senate Co-Chair
Representative Theodore Koffman, House Co-Chair
Joint Standing Committee on Natural Resources
121st Maine Legislature
State House, Room 437
Augusta, Maine 04333

Re: *Resolve, to Reduce Pollution of Androscoggin Lake by Repairing and Altering the Existing State-owned Barrier on Dead River in Leeds*

Senator Martin, Representative Koffman, and Members of the Committee:

Enclosed for your consideration is the Department's Report on the Dead River Dam and Androscoggin Lake. Resolve, to Reduce Pollution of Androscoggin Lake by Repairing and Altering the Existing State-owned Barrier on Dead River in Leeds, enacted in 2002 as Resolves, Chapter 123, directs the Department of Environmental Protection to undertake technical evaluations necessary to determine the feasibility of and costs for options for permanent flood control structures on the Dead River to protect the water quality of Androscoggin Lake.

The Resolve instructs the Department to submit this report to the Agriculture Committee because the Department of Agriculture is the state agency currently charged with maintaining the Dead River dam. However, because the issues involved are predominantly environmental, the two committees agreed earlier this year that this report would be submitted to the Natural Resources Committee, with copies to the Agriculture Committee.

I hope you find the report informative, and I would be happy to answer any questions you may have.

Respectfully,

Andrew C. Fisk, Director
Bureau of Land & Water Quality

cc: Joint Standing Committee on Agriculture

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Report on the Dead River Dam and Androscoggin Lake

Prepared by
Maine Department of Environmental Protection

April 5, 2004

The Dead River Dam was built by a state/local partnership in the 1930's to limit the flow of polluted Androscoggin River floodwaters into Androscoggin Lake. Androscoggin Lake bears the unfortunate distinction of being the only lake in the state which receives floodwaters from a Class C river through a natural reverse-flow phenomenon. As flood waters rise in the Androscoggin river, the Dead River reverses its flow and Androscoggin Lake serves as a flood storage reservoir. Prior to the construction of the dam, this would have occurred several times in an average year. The Androscoggin River watershed above the Dead River encompasses approximately 26-thousand square miles and has 11 licensed waste water discharges (8 municipal and 3 industrial).

Resolve, to Reduce Pollution of Androscoggin Lake by Repairing and Altering the Existing State-owned Barrier on Dead River in Leeds, enacted in 2002 as Resolves, Chapter 123, directs the Department of Environmental Protection to undertake technical evaluations necessary to determine the feasibility of and costs for options for permanent flood control structures on the Dead River to protect the water quality of Androscoggin Lake.

A brief review of some of the resources that have been committed to studying Androscoggin Lake illustrates the level of effort that has been involved. Chapter 123 allocated $20,000 for studies of the lake. This money was committed to toxics studies targeting dioxin, mercury and PCBs. This was in addition to $22,000 from the SWAT program, $30,000 from the Maine Outdoor Heritage Fund, and $64,000 from the dioxin monitoring program, committed to studying these toxics in Androscoggin Lake. Since 1976 the DEP has been working with the Androscoggin Lake Improvement Corporation (ALIC) to provide support to local volunteers monitoring trophic conditions in the lake. Beginning in 2000, this was supplemented by phosphorus sampling through financial support from ALIC, as well as International Paper and Mead Paper Co.. Through the Non-Point Source Grant Program the DEP has provided $24,125 for the hydrological modeling and dam assessment work performed by E/PRO Engineering and Environmental Consulting. The NPS program has also provided $16,990 to support local efforts to develop a watershed survey and a watershed management plan for Androscoggin Lake. The Town of Wayne and ALIC provided $18,850 in local matching support for the watershed survey and planning projects. The Towns of Wayne and Leeds contributed a total of $15,000 to fund the study of wetland resources and fisheries habitat.

The $40,000 allocated by Chapter 123 for repairs was used in the fall of 2002 to install new flashboards on the Dead River Dam, and repair a potentially serious erosion problem at the west abutment of the dam. The new flashboards should reduce the frequency of

flooding, providing some additional protection for the lake. The flashboards proved effective at keeping the spring floods of 2003 out of Androscoggin Lake, unfortunately heavy rains in the fall of 2003 caused the Androscoggin River floodwaters to overtop the dam. Then in December, 2003, the flashboards were damaged in an unusual flood in which floodwaters combined with ice in the river to bend about half the supporting pins over. The flashboards are currently in need of repairs estimated at three to four thousand dollars.

Over the past two years representatives from the towns of Leeds and Wayne and from ALIC have worked with the DEP to study the various issues relating to the dam and the river/lake system. Three public meetings have been held in the town of Leeds to discuss the work being done: August 1, 2002, November 18, 2003, and March 17, 2004.

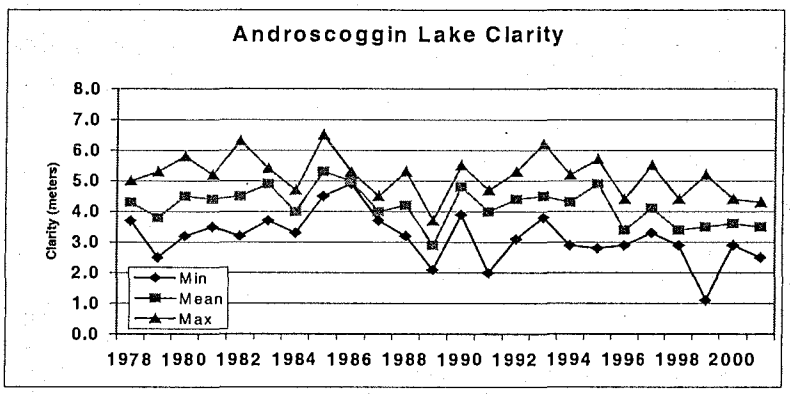
While we now have a much better understanding of these issues, questions remain and there is more work to do. Many of these questions can only be answered by continued monitoring of the lake to see how it responds to the presence of the new flashboards and to other efforts to control pollution. It is important that the dam and new flashboards be maintained while this monitoring takes place.

Perhaps the most important finding is that the Dead River Dam continues to serve an important pollution control function. The DEP's studies indicate that the dam with new flashboards will protect the lake from levels of phosphorus in the Androscoggin River floodwaters that would cause serious water quality problems in the lake. The BioDiversity Research Institute studies of toxic pollutants in the lake similarly concluded that if the dam is effective at retarding annual flooding events it "will reduce PBT (persistent bioaccumulative toxins) input and provide time for the lake to recover to PBT levels that are more reflective of neighboring lakes without waterborne point sources." ALIC has argued that the best way to protect the lake in the long term is to restore the natural ingress and egress of the river into the lake. While the presence of the dam may have negative impacts on the lake system, these impacts, to the extent they are understood, seem to be outweighed by the benefit to the lake of having the dam in place.

As outlined below, the DEP is recommending that the parties involved in these issues continue to work together to maintain the dam with the new flashboards and to continue to study the river/lake system. This situation requires an adaptive management approach, through which we continue to learn about the system and adapt the management to respond to what we learn. Both the wetlands and phosphorus studies have suggested that it will take at least five years to see any real impacts from the new dam configuration. Accordingly, the DEP is recommending that the management of the dam be revisited in five years, with a summary of all we have learned from the monitoring and from experience managing the dam with the new flashboards. The summary would also contain any recommendations for further studies or other management options to be taken. This study would be prepared in consultation with the interested parties and submitted to all parties and the legislature in 2009. Depending on the outcome of those studies, an additional five years of monitoring and corresponding summary report may very likely be necessary.

Phosphorus and Trophic Condition of Androscoggin Lake

Androscoggin Lake is currently listed in category three of Maine's Integrated Water Quality Monitoring and Assessment Report. Category three lists "Lake Waters with Insufficient Data or Information to Determine if Designated Uses are Attained." Androscoggin Lake is on this "watch" list due to its trophic condition. With the lake at about 15 parts per billion phosphorus in most summers recently, a significant algal bloom in 1999 and near bloom conditions several times, the DEP is concerned about the lake's trophic state. The data does not yet establish a declining trend in trophic state, but the lake is being watched by the Department to see if a clear trend emerges.



Since 1976, DEP has been working with local volunteers to monitor the water quality of Androscoggin Lake, developing one of the best data sets in the state on lake trophic conditions. Beginning in 2000, this monitoring was supplemented by a phosphorus sampling program in both the lake and the Dead River. The laboratory expenses for this phosphorus sampling were shared between the Androscoggin Lake Improvement Corporation (ALIC), International Paper Co., and Mead Paper Co. In addition to this water quality information the DEP contracted with E/PRO Engineering for hydrological modeling of the flood flows into the lake and how these flows were affected by various dam options.

Based on the hydrologic modeling conducted by E/PRO and the phosphorus sampling conducted since 2000, DEP has modeled the phosphorus impacts to Androscoggin Lake under various dam scenarios. This modeling indicates that, with the dam and new flashboards in place, point sources of phosphorus in the Androscoggin River will contribute less than 1% of the total phosphorus loading to Androscoggin Lake. However, without the dam the point source contribution would represent about 8% of the total phosphorus loading to the lake. Similarly, the non-point sources of phosphorus in the Androscoggin River are predicted to contribute 8% of the phosphorus loading to Androscoggin Lake with the new flashboards in place. However, with no dam these non-point sources would represent about 65% of the total phosphorus impacting the lake.

Proportional Effects of Sources on Total Phosphorus in Androscoggin Lake					Lake
	Dead River	Dead River	Direct	Internal	Total
	NPS Only	Point Source	Watershed	Sources	ppb
No dam	16.8	2.0	5.6	1.5	25.9
Dam @275.3' MSL	3.1	0.2	7.9	1.5	12.7
3 + 3.5 ft Boards	0.8	<0.1	8.2	1.5	10.6
Dam @ 282' MSL	0.1	<0.1	8.3	1.5	9.9

The phosphorus modeling done by the DEP shows that the Dead River Dam has been somewhat effective at protecting Androscoggin Lake from the full impact of point and non-point source phosphorus from the Androscoggin River. Without the dam, Androscoggin Lake would have a much higher phosphorus level, and would likely be suffering algae blooms every summer. Under the status quo of the past few years, with the dam in place but without consistent flashboards maintained, the combination of phosphorus inputs from within the lake watershed and from the river have resulted in phosphorus levels that give rise to concern.

With the funding provided in Chapter 123 for repairs to the dam, new flashboards were installed in the fall of 2002, and a potentially serious erosion problem at the west abutment of the dam was repaired. The new flashboards are taller and stronger than the previous flashboards, hopefully keeping out more floods and staying in place longer. DEP modeling indicates that if these new flashboards can be kept in place consistently, Androscoggin Lake should see decreasing phosphorus levels, allowing it to be removed from the DEP watch list. While the flashboards withstood the spring flooding in 2003, they were damaged by an unusual flood in December, 2003, which combined floodwaters with ice in the river. The flashboards are currently in need of repair, which should be accomplished before the spring floods.

ALIC has urged the DEP to pursue non-point source phosphorus reductions in the Androscoggin River watershed with a goal of reducing phosphorus to a level where the dam would no longer be necessary, and the flood waters from the river could be allowed to flood naturally into the lake. The Department is supportive of efforts to reduce non-point phosphorus in both the Androscoggin River watershed and the Androscoggin Lake watershed. However, given the approximately twenty-six thousand square mile size of the Androscoggin River watershed and the realistic potential of substantially reducing non-point phosphorus during flooding events in a watershed of that size, it is unlikely that non-point source projects in the Androscoggin River watershed would reduce phosphorus in Androscoggin Lake sufficiently to allow the removal of the Dead River dam in the reasonably foreseeable future.

If the dam were removed, DEP modeling indicates that the total phosphorus levels in Androscoggin Lake would reach about 25.9 ppb, with 16.8 ppb of this coming from the NPS phosphorus in the Androscoggin River and about 2 ppb coming from point sources. With the dam and new flashboards in place, the total phosphorus in the lake is predicted to be about 10.6 ppb. Even if the point sources were completely eliminated, it is not

reasonably conceivable that any combination of NPS projects could yield benefits sufficient to allow removal of the dam. Furthermore, it is the professional opinion of Department scientists that much of the non-point phosphorus in the river at the flood levels that enter Androscoggin Lake, even under the no-dam scenario, is naturally occurring, associated with sediment movement in river and stream channels and run-off from undeveloped land throughout the watershed of the Androscoggin River. This naturally occurring NPS phosphorus combined with the NPS phosphorus run-off related to land use activities throughout the watershed and the point source phosphorus all add up to levels in the flood waters that would significantly increase algae production in the lake and contribute to violations of water quality standards. While the DEP recognizes that as a long-term goal it would be ideal to clean-up the Androscoggin River to the point that the dam would no longer be a benefit, for the foreseeable future it will be important to maintain this dam to protect the lake from both natural and man-made sources of phosphorus.

Estimated Costs for New Dam Options

New Dam w/Rubber Crest	Effective Against Flood	Estimated Cost*	Affect on Androscoggin River Flood Level	Comments
10 ft High	2-year	$1,980,000	0.7 feet	
16 ft High	25-year	$2,845,000	2.2 feet	
18.4 ft High	100-year	$5,240,000	6 feet	
Dam Removal		$113,000		Add to new dam cost

With the assistance of E/PRO Engineering the DEP has also assessed the advantages of building a new, larger dam on the Dead River to keep out larger floods. The DEP modeling shows that the greatest phosphorus impact comes from the more frequent, smaller floods. Accordingly, building a higher dam to keep out less frequent larger floods would not result in significant phosphorus reductions beyond those predicted for the existing dam with the new flashboards. The small additional reductions projected for the higher dams would not justify the substantial cost of developing a new dam. A higher dam would also increase flooding impacts on the Androscoggin River downstream of the Dead River. Blocking off the 5-year flood could cause a rise of about one foot at the Route 219 twin bridges, while blocking off the 50- or 100-year floods, could cause a rise of 3-6' above current flood levels. These flooding impacts have not been fully assessed, but may prove unacceptable and could prevent the building of a substantially larger dam.

Recommendation: The DEP will continue its partnership with local volunteers to monitor the trophic state of Androscoggin Lake to assess the effectiveness of the Dead River Dam with the new flashboards. The DEP will provide support for this monitoring through its Lakes Program funding.

In 2000, through the federal 319 Nonpoint Source Pollution Control grant program the DEP provided support to the Town of Wayne and ALIC to conduct a watershed survey of the direct watershed of Androscoggin Lake. The purpose of this survey was to identify sources of erosion and sediment transport in the Androscoggin Lake watershed in

anticipation of developing a Watershed Management Plan and BMP implementation strategy.

In 2001, 319 support was provided to the Town of Wayne and ALIC for the development of a watershed management plan based on this survey. The preliminary water quality goals included stabilizing phosphorous concentrations in the lake and maintaining dissolved oxygen levels at concentrations suitable for the current fishery. This will be achieved by: developing a strategy for addressing non-point sources identified in the Watershed Survey and the diagnostic work being done by DEP and ALIC; educating lakeshore and watershed residents about water quality and watershed management practices, and; establishing financial and administrative support for ongoing watershed protection and improvements as watershed development pressures increase. The draft of this watershed management plan was recently released.

The DEP will continue to be available to work with the parties to pursue implementation of the watershed management plan. The DEP in partnership with other interested parties will also explore non-point source control options to reduce phosphorus in the Androscoggin River watershed.

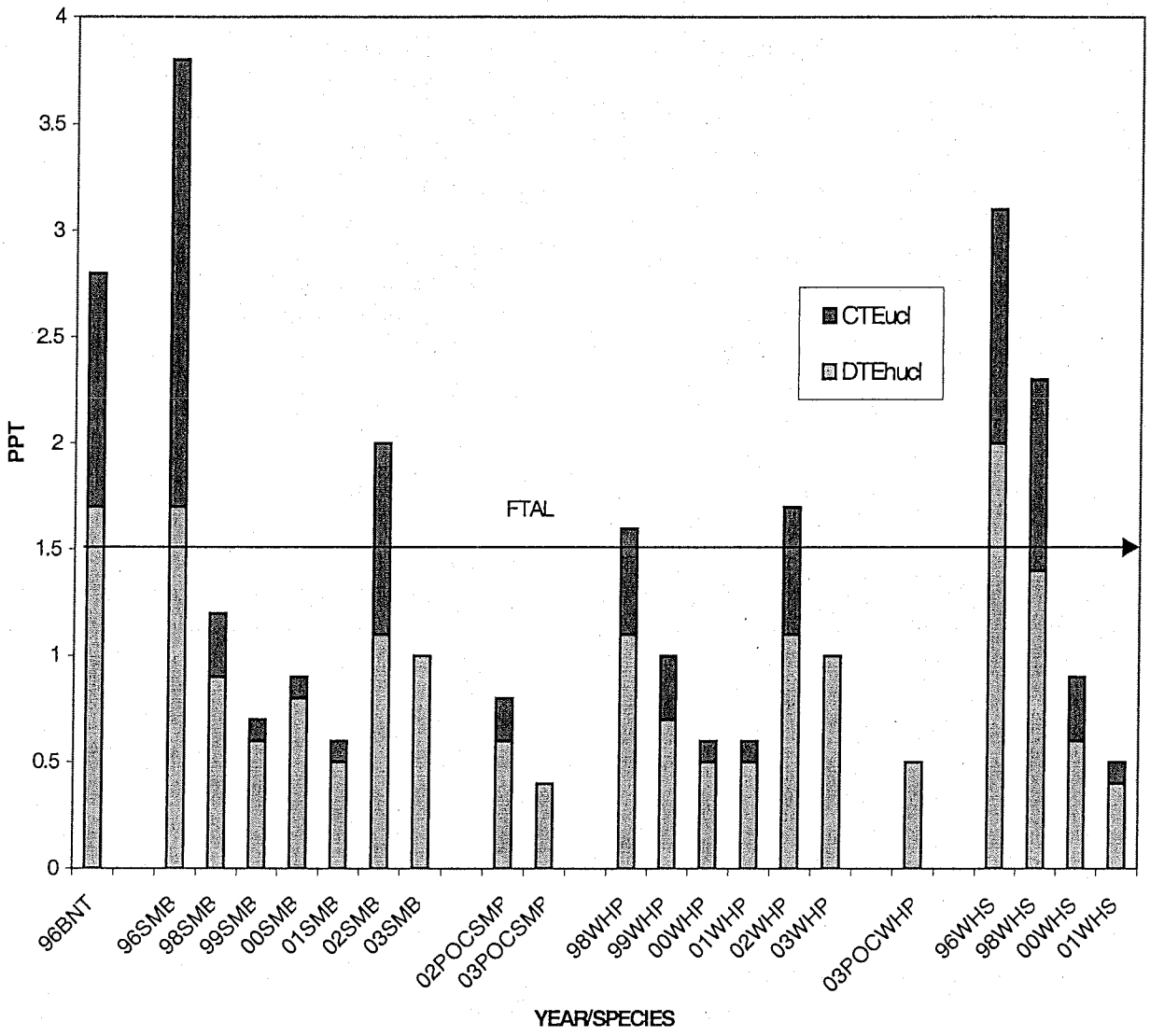
Persistent Bioaccumulative Toxins (PBTs)

The most recent studies of dioxin and other toxins in this system continue to raise concerns about dioxin and mercury levels. Studies of dioxin were conducted by the Maine Department of Environmental Protection (DEP). Studies of mercury and PCBs were conducted by BioDiversity Research Institute under contracts with DEP and the Androscoggin Lake Improvement Corporation (ALIC). Discussions of mercury and PCBs in this report are DEP's conclusions, which may differ somewhat from those of the BioDiversity Research Institute report that can be seen in their detailed report to DEP (Evers and Lane, 2004).

Dioxin

Dioxin levels (95^{th} upper confidence level with non-detects calculated at ½ the detection limit) in most samples of fish from Androscoggin Lake and Pocasset Lake are below the current Fish Tissue Action Levels (cancer based FTAL =1.5 ppt, reproductive based FTAL=1.8 ppt) (Figure 1).

FIGURE 1. DIOXINS (DTEhucl) AND COPLANAR PCB (CTEucl) IN FISH FROM ANDROSCOGGIN LAKE AND POCASSET LAKE



(BNT= brown trout, SMB= smallmouth bass, WHP= white perch, WHS= white sucker, POC= Pocasset Lake)

Dioxin levels in most all samples are, however, above a more restrictive FTAL (0.4 ppt) the Bureau of Health is considering as a potential revision to current FTALs to account for background dietary exposure to dioxins and furans. When combined with dioxin-like coplanar PCBs, concentrations are even higher. Whether a new FTAL would result in a new specific advisory for Androscoggin Lake or whether the current statewide fish consumption advisory based on mercury will protect consumers of Androscoggin Lake

fish from an unacceptable risk due to dioxin contamination will be determined by the Bureau of Health at the appropriate time. Even if the statewide advisory was protective, that would not necessarily imply that levels of dioxins and furan were no longer of any health concern.

Concentrations in fish also exceeded 11 of 16 (0.0066- 4.7 ppt) estimated safe target dietary concentrations for protection of bald eagles (USFWS, 2000) that are derived from studies of various avian species and therefore can be used as a threshold for osprey and loons as well. The 16 estimated safe target dietary concentrations were based on a combination of 4 NOAELs in the egg and 4 BMFs (biomagnification factors) selected from the literature as representative of possible conditions in the lake. A total of 6 of 16 target concentrations are below the detection limit (0.1 ppt); therefore, concentrations above the detection limit are suggestive of a potential negative impact. All fish in Maine have a detectable trace amount of some dioxins due to municipal waste combustion, medical waste combustion, and other diffuse sources, and atmospheric deposition. Any elevation above this background level, also found in Pocasset Lake fish, is evidence of potential additional negative impact by a more local source, such as the bleached kraft mills on the river for the fish in Androscoggin Lake.

The dioxin (DTE) concentration in one addled common loon egg collected from the Lake in 1998 (0.6 ppt), was below the lower limit (1 ppt) of the range of no observable adverse effect levels (NOAEL) reported in the literature for various avian species and used by USFWS to estimate risk to the bald eagle (USFWS, 2000). DTE were also well within the range of values from other reference locations in the nation. Since only one egg has been analyzed, however, definite conclusions cannot be reached.

After dropping substantially from levels observed in 1996, dioxin concentrations in fish remain significantly elevated above those in fish from Pocasset Lake, just upstream from Androscoggin Lake and not subject to flooding from the river. Concentrations in Pocasset Lake are similar to those of other lakes and river reference stations around the state that receive a trace, but insignificant, amount of some dioxins from atmospheric deposition but have no point sources. Complicating this analysis is the fact that no floods overtopped the Dead River Dam between the taking of the 2002 fish samples and the 2003 fish samples which might suggest that the concentrations in the fish are due to historical discharges from the mills rather than current discharges.

To the contrary, sediment samples from the Dead River and the lake in 2 of 3 years sampled do not indicate that there is a significant reservoir of dioxin accumulated in the lake to serve as a continuing source (Table 1). The other year's (2000) data are incongruent with the 1999 and 2002 data as are the 2002 deep hole data. In addition, deeper sediment samples did not have significantly different concentrations than surficial samples, except for one sample in the Dead River in the 2002 data which are not considered representative. These concentrations are not any higher than those from Pocasset Lake, and are significantly lower than those (22-69 ppt) from the Androscoggin River measured in 1991 (Mower, 2001).

Table 1. Dioxin Toxic Equivalents (DTE*) in Androscoggin & Pocasset lakes' sediment samples (ppt)

station	depth	1999 DTE*	2000 DTE*	2002 DTE*	location
L1	0-1"	0.1-0.7	7.6-8.1		lake outlet mouth 10'
	3-4"		8.0-8.2		
L2	0-1"	0.03-0.7		0.6-1.0	lake outlet lake 4'
L3	0-1"	0.01-0.7		6.4-9.6	lake deep hole 38'
	4-5"			na	
L4	0-1"	0.06-0.7		0.4-0.6	lake SW cove behind Lothrop Is
R1	0-1"		13.1-13.2	0.9-1.6	river at Riverbend campground
	2-3"		14.2-14.3	0.6-0.9	
R2	0-1"		7.9-8.3	0.3-0.8	river at dam 15'
	1.5-2.5"		11.5-12.0		
PLW	0-1			1.6-5.5	Pocasset L 20'
	3-4"			na	

na = not analyzed
* = range with non-detects at 0 and the detection limit

Therefore, it is not clear whether levels of dioxin in the fish are due to current or historical discharges from the mills. Continued annual monitoring under the DEP's Dioxin Monitoring Program will be necessary to make this determination.

Mercury

All freshwaters in Maine including Androscoggin Lake, fall under the statewide fish consumption advisory due to mercury and therefore do not fully support the designated use of fishing in the state's Water Quality Standards. The most recent work by BioDiversity Research Institute (Evers and Lane, 2004) continues to indicate even higher mercury levels in some parts Androscoggin Lake in various species, but more data are needed before definite conclusions can be made.

Mercury concentrations in tails of crayfish from the Dead River approach a high risk threshold for common loon prey and appear to be 2-6 times higher than in similar sized crayfish from the lake and several other streams. The difference is not statistically significant, but this may be the result of relatively small sample size. Concentrations in crayfish from Cove Road Brook are significantly higher than elsewhere on the lake or in other tributaries, but the small sample size (n=3) precludes a definitive conclusion. Furthermore, concentrations in crayfish in Cove Road Cove, in the lake near the confluence with the brook, are not elevated, but samples size was also low (n=2).

Mean mercury concentrations in small yellow perch from Androscoggin Lake are significantly higher than mean concentrations from other lakes in Maine, but there is no difference in medium, large, and extra large yellow perch than in other Maine lakes. This result is conflicting and may reflect wide differences in fish Hg levels within Androscoggin Lake and the Dead River. Because the bioavailability of Hg is unevenly distributed, small sample sizes remain problematic. Both large yellow and white perch

from the Dead River had significantly more mercury than in those species elsewhere in the lake and in most other Maine lakes, but the samples sizes (n=2 white perch; and n=1 yellow perch) are too small to be definitive.

Samples of blood, as an indicator of local food sources, are elevated in loons from some territories (Inner Cove, Blodgett Island) in Androscoggin Lake compared to other territories and other lakes. Territories with higher concentrations are not necessarily the same as those for its prey fish, however. Curiously, loons from the Frenchman's Cove, near the Dead River had only moderate mercury levels. More sampling will be necessary to be more definitive.

A water sample collected from Frenchman's Cove in 2002 had the highest concentration of mercury of 21 samples collected in a statewide project to develop wildlife criterion value for mercury. Additional samples are needed to verify this finding.

PCBs

Although PCB levels in all fish from Androscoggin Lake appear to greatly exceed the Maine Bureau of Health's Fish Tissue Action Level (11 ppb), there is some question about the data. Samples collected previously by DEP are currently being analyzed by the lab for further comparison to these reported by Evers and Lane (2004). The PCB level in the blood of an adult male common loon was elevated compared to those from other Maine lakes and was at a level that has impaired reproductive success in Caspian Terns.

Productivity of loons

Common loon productivity on Androscoggin Lake has been measured for at least 20 years. It has declined since the early 1990s: from the first period, 1983-1992, 29 chicks fledged and from the second period, 1993-2003, 11 common loon chicks fledged. During the first period, 0.48 chicks fledged per territorial pair, which represents a self-sustaining population. During the second period, productivity was far lower than self-sustaining at 0.17 chicks fledged per territorial pair. According to our survey data and recent population models, Androscoggin Lake is a population sink. (Evers and Lane, 2004).

Recommendation: The BioDiversity Research Institute report finds in part:

> "The Dead River floodgates can play a role in reducing PBT (persistent bioaccumulative toxic pollutant) loads entering via the Androscoggin River into Androscoggin Lake. A floodgate that can retard annual flooding events will reduce PBT input and provide time for the lake to recover to PBT levels that are more reflective of neighboring lakes without waterborne point sources. Recovery will be slowed because (1) the half-life of PCBs is long, (2), Hg is likely "stockpiled" in the Dead River Delta, and (3) there are other waterborne point sources for the lake (e.g. Cove Road Brook for both Hg and PCBs)."

DEP agrees that there is evidence that the Androscoggin River is presently and/or has historically contributed a significant amount of dioxin and mercury to Androscoggin

Lake. Additional monitoring will be necessary to determine the extent of contamination and to determine if sources are continuing or not.

Monitoring

DEP supports the concept of the need for continued annual monitoring for a period of 5 years to fulfill the following goals:

1. Determine the extent of contamination
2. Determine the risk to human and wildlife consumers
3. Further identify whether sources are current or historic
4. Evaluate the effectiveness of the dam and new flashboards in reducing PBTs in the lake.

These goals will be accomplished as follows:

1. DEP will continue to monitor dioxin in fish from Androscoggin Lake in its annual Dioxin Monitoring Program.
2. DEP supports continued monitoring of mercury and PCBs in Androscoggin Lake in a program similar to that outlined in parts 1A, 1B, 1C, 2, and 3 of the plan recommended by ALIC and BioDiversity Research Institute January 29, 2004. Although the plan outlines program elements for each of 5 years, DEP supports flexibility to modify the plan each year following year one depending on the results of the previous years as appropriate. Overall effort should remain the same each year unless DEP determines a smaller level of effort is sufficient. Annual costs are estimated at ~$15,000 per year except for year 1 and potentially another year when PCB analysis would be included for a total of ~$21,000 per year. DEP will support ALIC in seeking funding, from sources such as Maine Outdoor Heritage Fund grants or other public or private contributions, to continue to study these concerns.

Maine has taken a leadership role nationally in the reduction of dioxin and mercury emissions. The DEP will continue to address sources of these toxins through the Dioxin Monitoring Program, through wastewater discharge licensing, and other programs as appropriate.

Wetlands

The same reverse flow flooding phenomenon which allows Androscoggin River water into Androscoggin Lake has also created a unique natural environment on the Dead River Delta which extends into the lake. The Delta is the home of the cat-tail sedge (Carex typhina), a rare plant ranked S1 by the Maine Natural Areas Program. S1 is a "State Rarity Rank." A species is ranked S1 if it is critically imperiled in Maine because of extreme rarity or because some aspect of its biology makes it especially vulnerable to extirpation from the state. The Delta also supports two rare natural communities, the Silver Maple Floodplain Forest and the Hardwood River Terrace Forest.

Studies undertaken by Woodlot Alternatives for the Towns of Leeds and Wayne indicate that there may be changes in wetland plant communities in the Dead River delta if the new flashboards substantially eliminate annual lake flooding above elevation 272 ft msl (mean sea level). The Woodlot report recommends a long-term monitoring program, to track both long-term changes in species composition of these communities as well as any migration of the current community boundaries. Woodlot recommends monitoring for a minimum of five years to see if such changes occur.

Recommendation: The DEP will work with the Towns of Leads and Wayne and other interested parties to develop a monitoring program for the Delta, as agreed among the parties. The DEP will also work with these parties and other state and federal agencies to secure funding for this work.

Erosion Control on Riverbank

In its 1985 report to the legislature the Department of Agriculture discussed the erosion problem on the bank of the Dead River just downstream (Androscoggin River side) of the dam. The location of the dam at this bend in the river is thought to be contributing to this erosion and the continuing loss of the adjacent agricultural land. The 1985 report concluded:

> "In addition to making a decision on management options, the Legislature needs to consider the extent of the State's responsibility to address the existing erosion problem."

This erosion problem persists to this date. The most recent assessment by E/PRO engineering estimated the cost of addressing the problem at $97,000.

Recommendation: The DEP will work with other state and federal agencies and interested parties to identify options for addressing the erosion on the west bank of the river which threatens the adjacent agricultural field.

Dam Ownership and Maintenance

The seventy year history of the Dead River Dam is full of attempts at establishing a stable management program. The original legislation authorizing the dam established a partnership in which the costs and responsibilities for constructing the dam were shared between the state and local authorities. (P&SL 1931, Chapter 127) The dam was to be constructed under the guidance of a board of directors made up of four local citizens and the Commissioner of Inland Fisheries and Game. Costs of construction were to be apportioned, one third contributed by the state and two-thirds contributed by the counties of Kennebec and Androscoggin and the Town of Wayne.

After construction the 1931 legislation directed that all maintenance and repairs were to be the responsibility of the Town of Wayne. Title to the dam was to be held by the State. Since 1931 the maintenance responsibility has been shifted from the town to the Department of Inland Fish and Game, to the Public Utilities Commission, back to Fish and Game, then to the Soil and Water Conservation Commission. The Department of Agriculture inherited this responsibility upon the dissolution of the Soil and Water Conservation Commission. Throughout much of this history the dam has suffered from lack of funding and periods of neglect. The local municipalities and the Androscoggin Lake Improvement Corporation have carried the burden of this maintenance for many years.

In the Chapter 123 Resolve the DEP is asked to make recommendations on permanent future ownership of the dam. Since the passage of the Chapter 123 Resolve, the DEP, the Department of Agriculture, the Towns of Leeds and Wayne, and ALIC have worked together to study and maintain the Dead River Dam. Contributions for some of this work have also come from International Paper and Mead Paper. Over the past few years the parties have gained valuable experience working together, and this process should continue. With the many issues connected to this dam, the DEP finds that the best path forward is for the state to retain the title to the dam with a commitment not to abandon the dam and for the interested parties to form a state/municipal/private partnership for the ongoing maintenance of the dam, and continued monitoring of the Androscoggin River / Androscoggin Lake system.

Recommendation: The DEP recommends that the state agencies, local municipalities, private and non-profit parties with an interest in the Dead River dam establish a cooperative agreement for the maintenance of the Dead River Dam with the new flashboards. This agreement would include a maintenance steering committee with representatives from the state and local levels. The agreement would be for a five year period, and be renewable by the parties to coincide with DEP's next summary report on the dam. Before the end of the first five year agreement, the DEP would make a recommendation for an alternative state agency to replace the Department of Agriculture as the agency with primary responsibility for the dam. Title to the dam would remain with the state, with a commitment not to abandon the dam so long as it is necessary to protect the water quality of Androscoggin Lake. The Department of Agriculture has no funding or staff available for the maintenance of the dam. International Paper and Mead Paper have expressed an interest in contributing to the maintenance, and have begun discussions with ALIC about how this might be accomplished. It is hoped that these discussions will be fruitful, or other mechanisms for securing funding will have to be found. An estimate of future maintenance costs is attached.

As a component of this maintenance, a USGS gage should be maintained on the Dead River. Since 2000, the DEP Lakes Program has supported a US Geological Survey gage on the Dead River, sharing the cost with USGS on a 50/50 basis. This gage has provided valuable information both for the day-to-day monitoring and maintenance of the dam, by identifying when the trashracks were blocked, and for the modeling of phosphorus inputs to the lake. Previously this gage monitored stage height, flow and direction. Due to the

expense of supporting these multiple functions, the agreement between USGS has been revised to provide only stage height. This is the most valuable information for the purposes of monitoring this system. USGS will cost-share the $3,400 annual expense of this gage, requiring a local match of $1,700 which will be provided by DEP in 2004. The future of this cooperative project is dependent on continued USGS funding availability.

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Estimated Future Maintenance Costs of Dead River Dam

Flashboard Maintenance

Flashboard and Pin Replacement $8,000
Frequency of Replacement 4 years
Annual cost $2,000

Flapper Gate Maintenance

Gate Replacement $5,000
Frequency of Replacement 5 years
Annual cost $1,000

Log/Trash Removal

Major log/debris removal $1,000
Frequency of major cleaning twice per year
Routine weekly cleaning $200
Total annual cost $4,000

USGS Stage Gage Maintenance

Annual local share $1,700

Other Miscellaneous Maintenance

Right-of-way maintenance
Erosion control in dam vicinity
Contingency
Total annual cost $1,300

Total Annual Maintenance Expenses **$10,000**