Verbal Testimony
April 27, 2015
LD 800
By Steven J. Whitman, P.E./P.L.S.

I am submitting a summary report on the St. Croix River which includes a preliminary hydraulic analysis and review of existing reports and documents. Extensive research was conducted at various state and local agencies; however, additional resources remain untouched such as the registry of deeds. Attached is a bulleted summary on the front page. Within the summary report there is much more detail on each section.

Section 1: There were three major natural barriers on the St. Croix River; Salmon Falls, Sprague's Falls, and Grand Falls. All three major barriers had river velocities and physical attributes that prevented migratory fish from accessing the upper lakes. An 1807 survey plan depicts Salmon Falls very clearly indicating that the river was very restrictive and narrow at this location with a 14ft-16ft drop in pitch which produced severe turbulence and white water. River velocities at this location were twice the maximum swimming speed of the alewife and the other two barriers were similar in nature consisting of extreme river velocity, turbulence, rapids, and vertical drops which restricted the alewife and all other migratory fish as well.

Section 2: Colonial events indicate that the St. Croix River fishery crashed long before construction of the Union Dam in 1825. This dam has been previously accepted as the end of the good fishing on the St. Croix River as it stopped migratory fish from supposedly accessing the upper lakes. However, due to the fishery collapsing, Massachusetts legislative records include a bill filed in 1811 to stop and limit the type and days of **all** fishing on the river.

According to the Flagg report 2000 barrels were harvested from the lower river during that time. Considering the lake areas which were smaller then, since there were no dams in place, and according to Flagg's production figures, 45,000 barrels of alewives would have been available each year if the alewife spawned in the upper lakes. The 2,000 barrels harvested per year were only 4-5% of what was supposedly available, yet the fishery crashed after only a few years in the very early 1800's due to overfishing. Therefore, the actual numbers of alewives and their spawning area had to be **much less**. Simply put, the amount of available spawning area truly available, at that time, could not even support 2000 barrels of alewives.

This lack of spawning area is reinforced by the discovery of Dr. Millner's review of the Flagg Report which omits the fact that besides alewife bones, flounder, sturgeon and cod fish bones were also found at the archeological dig site at Mud Lake Stream (Spies and Crammer, 2005) Flagg in his 2007 report develops this theory and concludes, *"Therefore, I conclude that the*

alewives at the Mud Lake Stream site were caught in Mud Lake Stream or the immediate vicinity and therefore successfully passed upstream above Salmon Falls and Grand Falls." As a result of his conclusion, since alewife bones were present then we can assume Cod, Flounder and Sturgeon swam to the upper lakes above Grand Falls too! Of course this is impossible. It becomes obvious; all four fish were transported here by humans as a food source from the ocean to the camp site.

Section 3: Maine Inland Fisheries and Wildlife fish survey reports of the 1950's show no evidence of alewives in **any** of the upper lakes. If they were present in our lakes during colonial times, then upon construction of the dams, some of them would have been surely trapped creating permanent alewife populations. This has been observed in several other lake systems throughout New England. In fact, this is something we are seeing today in our lakes that were infected in the 1980's which now carry permanent alewife populations.

Section 4: Annual Canadian Reports of the 1870's confirm that Salmon Falls was a harsh place for migratory fish. In several years, they speak of the water being *"too strong"* for the alewife and *"they can not get over the falls."* Also, in a 1880 survey plan found at the Charlotte County, N.B. archives shows that Salmon Falls was severely altered probably by dynamite blasting between 1807-1880. However, even with several islands being removed and the falls being altered; it was still a formidable barrier in the 1870's.

Section 5: The Steering Committee report of 1988 - Department of Fisheries and Oceans warned of possible side effects to Spednic Lake by alewife introduction to juvenile rainbow smelt, salmon growth rates, and juvenile small mouth bass. All their fears came true as the rainbow smelt and small mouth bass populations were wiped out. Salmon became long and skinny and were often found in poor condition due to the lack of smelt which they primarily utilized for food.

Section 6: Water level data of Spednic Lake from 1969-2010 basically shows the draw down operation of the lake has not substantially changed in over 40 years and was not the reason for the crash. Simply put, the lake flourished before the alewives, crashed upon introduction of them, and recovered once they were stopped from entering.

Section 7: Alewives severely affect the amount of available Plankton in lake eco systems and this has been proven by the IF&W studies of the 1980's and countless other studies in other areas of the country. As adults, they are primarily plankton eaters, but will feed on insects, larval, small fish, and other organisms. They feed from the surface to the bottom of a lake (entire water column), essentially devouring everything in their path. They are often called *"eating machines"* and are willing and easily adapt to living year round in fresh water.

. **ALL** our lakes that were invaded in the 1980's now have substantial growing populations of lake alewives. Sometimes the lakes literally boil with them on the surface. This includes East Grand Lake, Spednic Lake, Big Lake, Long Lake, Lewey Lake, and the Grand Falls Flowage. The salmon in these lakes have become long and skinny due to the smelt population becoming almost non existent as it became in Spednic Lake during the alewife invasion of the 80's. Huge clouds of bass fry are no longer seen along our shores and white perch numbers, especially in Big Lake, have been devastated.

Alewives are known to be *"prolific spawners"* and according to the Department of Marine Resources (DMR) each female can lay 60,000-100,000 eggs. Other studies have put this number much higher to almost 300,000 eggs per female. For **extremely** conservative purposes, we will assume 60,000 eggs per female and a very conservative successful hatch rate of only 10% (some studies have determined this value as high as 70%). Therefore, during the 2.6 million alewife run of 1986 where half of them could be considered females, 7.8 billion alewife would have been born to start searching the shores lines for food. To put things in perspective, if these young of the year fish are one inch long, and are placed end to end, they will circle the entire earth at the equator five times! About one percent (780 million or so) of these would have survived by the end of the summer to supposedly return to the ocean. If only 10%-15% of these remain behind, this would have resulted in a population growth of 10 million alewives taking up permanent residence in our lakes **each and every year**. And this does not even consider the percentage of adults that may stay as well (The Lake George Study indicated that this may be a substantial number). All of these numbers are based upon a run of 2.6 million, but future runs have been predicted to be 9-10 million or more! The impact of unrestrained alewives to the food chain, plankton and other organisms will be catastrophic and will ultimately destroy the native fish populations. **Unfortunately, we are seeing that happen today within our lakes, as the alewife continues to live happily in fresh water year round and multiply.** And all of this is happening with no current alewife runs from the sea!

Section 8: No Environmental Impact Statement was ever developed or filed with DEP for the passage of LD 72. Introducing millions of fish into an eco system, will definitely change its water quality as the amount of plankton will be reduced.
This alone would trigger, by State Statutes and the Clean Water Act, the requirement of obtaining a permit. Part of the permitting process would be the filing of an Environmental Impact Statement which would have required detailed and complete water quality studies, economic impacts, social impacts, lake eco system impacts, and several other crucial environmental concerns being analyzed. To date no permit has been filed and nothing has been done.

Section9: The EPA decision letter was based upon erroneous and incomplete information. They based their decision on the assumption the alewife was *"naturally occurring"* and native to the upper St. Croix Lakes. The alewife was never native and should be considered an invasive species. Introducing them would actually be a violation of the Clean Water Act.

Section 10: Allowing millions of fish into an eco system without the proper studies being completed on each lake and bypassing the Environmental Impact Statement process is dangerous. Conducting my investigation, I was amazed on how much vital evidence was not discovered and not used on this project and there are still more sources that need to be researched.
Being fortunate to having worked on hundreds of environmental projects in my 40 year professional career, I was surprised on how little attention was given to the amount of studies and analysis on a project as complex and involved as this one truly is. The few minor studies that have been completed to date on our lakes so far are severely lacking

in many details.

As an example, the Lake George Study considered an alewife introduction of 6 alewives per acre and concluded that there was no harm to the native fish populations. Projected actual loading rates in our lakes will be at least 40 times this concentration. There is no way this study can be used to predict the true effects on the upper lakes.

Another example is the Willis report where the author admits to *"no density data was available for alewives or smallmouth bass in most study lakes"* and the depth of sampling was limited to the number of hours available and dollars. He goes onto state, ***"the number of sampling activities limited the depth of information that could be collected from any one water body".*** More importantly he limits the soundness and scope of the study, ***"this study cannot suggest a threshold stocking or escapement levels at which alewives and smallmouth interactions change or address the implications of diet overlap that might occur at the larval or black fry stage of development."***

In summary, when our lakes have been devastated, businesses lost, property values have plummeted, and sportsman have long disappeared from our area, leaving our precious resource in ashes, it will be too late.

However, it may be too late already, as the reckless and hurried passage of LD 72 has severely affected our prestine lakes and fisheries with permanent alewife populations for years to come.

Passage of LD 800 must be done to hopefully begin the correction of a horrible wrong.

Steven J. Whitman, P.E./P.L.S.

Professional Background & Experience

- Bachelor of Science Degree in Civil Engineering with continued graduate work in the Environmental Sciences.
- Registered Professional Civil Engineer in six states including, Maine, Massachusetts, New Hampshire, Rhode Island, Connecticut and Florida.
- Registered Professional Land Surveyor in three states, Massachusetts, Connecticut and Florida.
- Registered Grade 4 (highest level) Drinking water Supply operator- Massachusetts
- Registered Grade 4M Wastewater treatment plant operator - Massachusetts
- Registered Soils Evaluator - Massachusetts
- Registered Master Maine Guide
- Have attended dozens of seminars and courses on aquatic chemistry, groundwater hydrology, water and wastewater analysis and treatment, hydraulic computer modeling of rivers, and land surveying law.
- Have served many times in State and County Courts as an expert witness related to water hydraulic issues, structural problems and land disagreements.

Mr. Whitman has worked both in the private and public sectors for almost 40 years in the Civil Engineering field. His public sector experience involved working as a City Engineer and Director of Public Works for a large city (population 40,000) overseeing the daily operation of the water and sewer systems, highway, forestry, cemetery, engineering and landfill departments. During his tenure he was directly involved with the development and design of several city projects involving water and wastewater treatment facilities, water and sewer line design, lake analysis and treatment programs, rehabilitation of reservoirs involving algae, turbidity and color problems, sediment analysis and removal processes, pump stations, and underground utility rehabilitation.

For many years he owned and operated a Civil Engineering - Land Surveying firm (35 personnel) that was concerned with hazardous waste assessments and treatment/rehabilitation processes involving ground water treatment. Heavily involved in Environmental projects, he directly oversaw the design and development of flood plain studies, hydraulic/chemical analysis of lakes, rivers and streams, complex drainage systems, sediment transport studies, water, sewer and drain line design including pump stations and treatment plant design. Additionally, land development both residential and commercial, land surveying, highway design, onsite disposal systems and land court proceedings were routinely conducted by the company.

Being retired, he now owns and operates Long Lake Camps, a Sporting Lodge, in Princeton, Me.

DR MILLNER'S REVIEW
OF FLAGG AND WILLIS REPORTS

1.0 Statement of Qualifications

My name is Dr. Glenn C. Millner. I am a partner and Principal Toxicologist at the Center for Toxicology and Environmental Health (CTEH), L.L.C., an environmental consulting firm that is part of the University of Arkansas for Medical Sciences (UAMS) Incubator Program. I am also an assistant professor in the Department of Environmental and Occupational Health, College of Public Health, UAMS, and an adjunct assistant professor in the College of Medicine, Division of Interdisciplinary Toxicology, UAMS. CTEH is an environmental consulting firm that has several specialties including toxicology and risk assessment. CTEH toxicologists have evaluated the human health risks posed by over 300 emergency response sites, 20 Superfund sites, hundreds of Resource Conservation and Recovery Act sites, State Superfund sites, voluntary cleanup sites, "brownfields," and County-lead sites.

I hold a Bachelor of Science degree in Biology from the State University of New York College at Brockport (1976), a Masters of Science degree in Aquatic Ecology (Limnology) from the State University of New York College at Buffalo (1979), and a Ph.D. degree in Interdisciplinary Toxicology from the UAMS (1988). During my years of employment, I have held academic, research, and consulting positions. From 1981 to 1984 I was a Senior Level Scientist at Ecology and Environment, an environmental consulting company. One of my primary responsibilities was serving as an authorized representative/technical consultant for the United States Environmental Protection Agency (USEPA); I also conducted fish studies in Saudi Arabia, Columbia South America, Vieques Island, and many freshwater streams in the US. From 1984-1988 I was a research scientist at the National Center for Toxicological Research, Division of Genetic Toxicology, Department of Health and Human Services, Food and Drug Administration, Jefferson, Arkansas. From 1988 to 1992 I was a practicing toxicologist for Terra Inc. From 1988 to the present I have been on the faculty of UAMS. As a lecturer, I have spoken on toxicology, government regulations, and risk assessment subjects to graduate and medical students for over 20 years. I also lecture to industrial hygiene and nursing graduate students. From 1992 to 1997 I was the Director of Health Sciences for Terranext, an environmental consulting firm.

I am a member of a number of professional associations. I am a member of the American Industrial Hygiene Association, Society of Environmental Toxicology and Chemistry, American Chemical Society, Society for Risk Analysis, Society of Toxicology, South Central Chapter of the Society of Toxicology, and the Association for the Environmental Health of Soils. I am also a scientific reviewer of manuscripts including Risk Analysis: An International Journal and the Journal of Soil Contamination, and I served on the editorial board of the International Journal of Environmental Forensics for several years.

I have a Masters Degree in Limnology which is the study of Lakes and Streams. I was formerly the Field Coordinator at Great Lake Laboratory in Buffalo, NY. Great Lakes Lab conducted limnology studies in all the Great Lakes (Erie, Ontario, Michigan, Huron, and

Superior) and tributaries and I served as field coordinator for the research cruises on the Research Vessel Charles A. Dambach. This work was done for the EPA and US Army Corp on Engineers. Consequently, I am familiar with research methods for Lakes and Rivers. I have served as an expert in both Federal and State Courts and have been accepted as an expert by the Courts over 50 times. I also have published extensively both in peer-reviewed journals and refereed books.

2.0 Understanding of Issues

It is my understanding that the Joint Standing Committee of Marine Resources the 127th Maine legislature is charged with determining whether alewives should be reintroduced into the St. Croix River and its tributaries. I understand that this issue is politically charged and that there are elements both for and against the introduction of alewives. Those for alewive introduction take the position that:

- Alewives are native species in the St. Croix and will be beneficial for fisheries.

Those against alewive introduction take the following position:

- Alewives are not native species and that introduction has already harmed fisheries as evidence by the decline in small mouth bass in Spednic Lake.

This review is not intended to provide an opinion either for or against the introduction of alewives but simply a critical review of the science, or lack thereof, behind those in favor of re-introducing alewives into the St. Croix and its tributaries. I am providing a third-party independent review. I am not being paid for this review and in the interest of full disclosure I do have a Camp on Big Lake for more than 50 years and want to make sure that decisions to re-introduce alewives are based on valid peer reviewed scientific studies and not junk science or advocacy science. From my review, the Joint Standing Committee of Marine Resources is basing their decisions mainly on two studies:

- Two Reports on Alewives in the St. Croix River: St. Croix River Alewife – Smallmouth Bass Interaction Study T.V. Willis Genetic Analyses of Freshwater and Anadromous Alewife (Alosa pseudoharengus) Populations from the St. Croix River, Maine/New Brunswick P. Bentzen and I.G. Paterson, November 2006, and

- Historical and Current Distribution and Abundance of the Anadromous Alewife (Alosa pseudoharengus) in the St Croix River A Report to the State of Maine Atlantic Salmon Commission 161 Capitol Street 172 State House Station, Augusta, Maine

3.0 Review of the Willis et. al (2006) and Flagg (2007) Reports

The Willis et al. (2006) report appears to be funded and published by Maine Rivers. This study is not published in a peer reviewed scientific journal. Likewise the Flagg (2007) study is a report to the Maine Atlantic Salmon Commission and has also not been published in a peer reviewed scientific journal. A publication that has not been peer reviewed in a scientific journal does not necessarily invalidate the findings or mean that the study is not valid. However, peer review is an important part of the quality control mechanism that is used to determine what is published, and what is not. In the scientific community, most scholarly work or research will not be seriously considered until it has been validated by peer review. Furthermore, the peer review process acts as a filter for interest and relevance to the field being studied. Therefore, peer review serves several purposes:[4]

- The scientific merit and validity of the article and its methodology.
- Has the research that is being reported been carried out well with no flaws in the design or methodology?
- Ensure that the work is reported correctly, with acknowledgement of the existing body of work.
- Ensure that the results presented have been interpreted correctly and all possible interpretations considered.
- Ensure that the results are not too preliminary or speculative, but at the same time not block the sharing of innovative new research and theories.

In this reviewers opinion the Flagg (2007) study appears to be an advocacy piece for the re-introduction of alewives. The authors do not disclose who paid for the study and the underlying data used to render opinions are not available in the report for an external reviewer to determine whether the data the author relied upon is supported by the author's conclusions. The author's main conclusion is that anadromous alewives historically ascended above salmon Falls and Grand Falls based mainly on archeological findings by another investigator (Spies and Cranmer, 2005). Flagg indicates that alewives were found at a campsite where calcined alewives bones were also present. Carbon dating of the campfire ash (not the alewives bone – that was not carbon dated) indicates that the burial ground is about 4,000 years old. Because alewive bone was present in the ash from a

campsite and that the campsite was a ½ day from the portion of the St. Croix above Salmon and Grand Falls the author then concludes that alewives were always present. This reviewer has a number of major concerns with the authors conclusion that the findings of bones at a campsite somehow proves that alewives were always in the St. Croix River above Salmon Falls and Grand Falls. First studies in the Great Lakes indicate that fish bones in Lake sediment degrade relatively rapidly on the order of year not decades, and second, and perhaps more alarming is what the author omitted from his report. The underlying data used by Flagg is from Spies and Cranmer (2005) who also reported other fish species found at the archaeological dig as follows:

- "The faunal sample is dominated (in numbers) by small fish bone, which is mostly alewife, with frequent flounder and sculpin. Sturgeon (scute or skin bone) is also common, although we cannot directly compare the frequency of sturgeon scute with other fish bones, because sturgeon do not have boney skeletons. The comparative weights indicate that sturgeon were perhaps the second most important fish compared with alewife. Based on this species mix, perhaps fishing was being done with weirs or nets set in the intertidal zone. Three bones of (at least one individual) large cod fish are present, possibly indicating fishing further from shore and/or down the estuary."

Spies and Cranmer appear to be speaking about an intertidal zone and saltwater environment NOT the St. Croix River above Salmon and Grand Falls. Following the authors logic, then are we to assume that cod, flounder and sturgeon were always present above Salmon Falls and Grand Falls? This reviewer also questions whether an archeologist has the background and training to identify alewife bone. Before accepting this study as evidence that alewives were always present in the St. Croix, the underlying data needs to be examined more closely because there are a number of confounders that seriously question the validity of Flagg's conclusions. This reviewer suggests that an expert in fish taxonomy or ichthyology independently examine the fish bone and verify that they are truly alewive bone and answer the question(s) why saltwater species are alsopresent. Even if Spies and Cranmer correctly identified 4,000 year-old alewives bone how does someone explain the

presence of flounder and cod being in a freshwater river? Surely the findings from the Flagg study can only be interpreted as speculative and that more study is needed before concluding that alewives have always been present. Would it then follow that sturgeon, cod, flounder should also be re-introduced?

In contrast to the Flagg study, the Willis et al. (2006) studies appear to be relatively well designed. The studies set out to examine the association between lakes with and without alewives on fish length and growth, young of the year mortality, diet overlap, bass tournament results, etc. The specific questions addressed are as follows:

- Does the presence of anadromous alewives result in lower condition, length or growth of smallmouth bass?
- Does the presence of adult anadromous alewives result in young-of-year smallmouth bass mortality as a result of adult alewife predation?
- Does the presence of young-of-year anadromous alewives result in diet overlap between smallmouth bass and anadromous alewives, a component of competition which potentially leads to lower growth or survival?
- Does the presence of anadromous alewives result in smallmouth bass tournament results that are lower than tournament results in lakes without anadromous alewives?
- Are landlocked alewives in the St. Croix drainage the result of a shift from an anadromous (seasonal migrant) to a landlocked (permanent resident) life style, or were they introduced from distant landlocked populations?

While this reviewer needs more time to examine the underlying data from this study and has some questions about sample size, reproducibility, etc. the data presented by the authors seem to support their conclusions. The conclusions of this study are as follows:

- "We found no evidence from available historic data for Downeast Maine lakes that the presence of alewives systematically harmed smallmouth bass in terms of length, condition or growth. 2a) Fish constituted only a tiny proportion of the diet of adult anadromous alewives. Alewives were not significant predators on smallmouth bass. 2b) In most lakes, young-of-year smallmouth bass and young-of-year alewives did not have an ecologically significant overlap in diet. In the one lake in which diets were similar, populations of bass and alewives have coexisted for over a century. Based on one year's data, therefore, competition for food between the two species does not appear to be important. 3) Smallmouth bass tournament returns in the past few years have been similar in lakes with and lakes without alewives, suggesting that the quality of sport fishing for bass does not differ systematically between lakes with and lakes without anadromous alewives. 4) Landlocked alewives are genetically distinct from the anadromous alewife populations in the St. Croix and in other investigated watersheds. They are almost certainly the result of an independent introduction of landlocked stock from lakes outside the watershed and not the result of a shift in alewife life history strategy within the watershed."

Interestingly and unexplainably, the study did not include Spednic Lake in their study design which is the subject of the controversy over the reintroduction of alewives. The study also did not examine the association between alewives on fish abundance (numbers) which again is the subject of the controversy. The Willis study does not provide the actual numbers of alewives present per unit acre or some other measure of fish abundance along with smallmouth bass abundance. A plot of fish abundance along with alewive abundance would be very instructive. Also, no where did any of the current studies address or account for the effect of effluent discharge (pollution) from the Woodland Mill on St. Croix alewive populations which is a mystery to this reviewer as historical discharges were foamy, turbid, contained a number of pollutants that are deleterious to fish, and the mill went through a series of improvement with their National Pollution Discharge Elimination System (NPDES) permit and was not permitted for many years until NPDES came into existence. All of the studies are silent on effluent discharge impacts. Thus, this study cannot be used as a basis for determining that there is no impact or effect of alewives on smallmouth bass numbers (abundance) because the study did not include this metric in their study design. To use this study beyond its inherent study design and to conclude that alewives have no impact on small mouth bass abundance is not scientifically defensible.

This reviewer has examined the two main studies that form the basis and science behind those in favor of re-introducing alewives yet neither of these studies answers the central and critical question (and concern) that is driving those against re-introducing alewives is the apparent decline of smallmouth bass in Spednic Lake concomitant with re-introducing alewives to the St. Croix. Until that question is answered it would not be prudent to re-introduce alewives. This reviewer also points out that the Willis study had difficulty in obtaining sufficient numbers of alewives and smallmouth bass young of the year in their study and has limitations on sample size. The limitation of this study is that it suffers from small sample size. Extrapolation of these results to the millions of alewives that are under consideration is beyond the scope of the study. The study cannot be used to support the millions of alewives under consideration for release because it simply did not study the impact of very large numbers of alewives; it only studies relatively small numbers of alewives. Finally, the study evaluated associations between alewives and smallmouth bass

and not causal inference.

Before leaving the issue of causation it should be noted that for any general causation analysis the judgment as to whether or not a causal relationship has been established for alewives introduction and a specific effect requires two distinctly different analyses of the literature in question (Hennekens and Buring, 1987). The first analysis involves the internal consistency (internal validity) of the reported association. That is, does the scientist performing the causation analysis believe the observed association between the exposure and the reported effect is a valid one? In this assessment the reported association and study are evaluated primarily for alternative explanations that arise within the study itself – that is, could chance, bias, confounding or some other factor related to the design of the study account for the reported finding? The second analysis involves the external consistency (external validity) of the reported association. Here the scientist determines whether or not the totality of the evidence taken from various sources provides a consistent and coherent consensus opinion that would support a conclusion of causality. When determining the external consistency of the reported association not all studies may be created equal. The experimental design, strength, biologic plausibility, species consistency, statistical analysis, and external consistency with the literature are but some of the factors of each individual study that may cause a scientist to give that study greater or lesser weight when considering the totality of the evidence, particularly when inconsistent or conflicting results have been reported. Thus, judging whether or not the reported association is causal extends well beyond simply citing the reported findings of a single study; it includes first, a critical review of the study itself, followed by an evaluation of that study to determine how well it is a reflection of the remaining data before the hypothesis posed by the association is deemed credible and valid. This reviewer is not convinced that these two studies are sufficient to establish a cause and effect of alewives introduction. The two studies at best show weak and not convincing and overwhelming evidence that alewives can be effectively re-introduced without affecting smallmouth bass abundance.

3.0 Summary and Recommendations

In summary, I have reached the following preliminary opinions to a reasonable degree of

scientific certainty:

- The two studies that form the basis for re-introduction of alewives are not peer reviewed scientific journal articles.

- The Flagg study has serious questions concerning its scientific validity.

- The Willis study does not address smallmouth bass abundance and did not include Spednic Lake in its study design.

- The available studies have simply not explained or addressed why smallmouth bass populations declined concomitant with large numbers of alewives being re-introduced.

- This reviewer recommends that the alewive bones alleged to form the basis for alewives always being present above Salmon andGrand Falls be independently verified by an ichthyologist or fish biologist with experience in alewive taxonomy.

Finally, it seems to this reviewer that the issue of re-introduction of alewives is a highly charged and important decision to make that has huge implications to both concerned guides and fisherman as well as other stakeholders in favor of re-introduction. The two studies that form the basis of re-introduction are not of sufficient scientific rigor and there is simply insufficient data to support a valid scientific decision to re-introduce alewives without more study to confirm these preliminary findings. This reviewer questions why the same scientists who are in support of alewive re-introduction does not feel compelled to fully understand the decline in smallmouth bass in Spednic Lake. It only seems prudent to understand fully why that happened before making these very important decisions.