MEETING SUMMARY

ALASKA WATER RESOURCES BOARD MEETING

June 25-27, 1980

The Alaska Water Resources Board met in Fairbanks at the Wood Center, University of Alaska, on June 25-27, 1980. The members of the Board were:

Charles Johnson, Nome LeVake Renshaw, Anchorage Peg Tileston, Anchorage Richard Sims, (Chairman) Kodiak Wayne Westberg, Anchorage David Vanderbrink, Homer Frederick Boness, Anchorage Ernst Mueller, (ex-officio) Commissioner of DEC Robert LeResche, (Executive Secretary) Commissioner of DNR

The Commissioner of DNR was represented by Brent Petrie. Charles Johnson and David Vanderbrink were absent. Chairman Sims called the meeting to order at 9:00 a.m. He welcomed everyone to the meeting and introduced the Board members, Steve Mack of DNR, Kate Graham of DEC and Bud McAlpine of the Yukon Territory Water Resources Agency. Chairman Sims reviewed the agenda and noted additions and changes. Chairman Sims also noted that Brent Petrie was in Anchorage at an important budget meeting and stated he was concerned that at this meeting DNR might internally try to remove several positions from the water programs that the Board had very heavily lobbied to get approved by the Legislature. On Thursday after the budget meeting the Board would know more.

The March 11-13, 1980, meeting summary was approved after adding "application" after "permit" on page 6, line 3. Chairman Sims then turned the meeting over to Dr. Robert Carlson, Institute of Water Resources, for the workshop on water resources and placer mining.

Workshop on Water Resources and Placer Mining.

At 9:15 Dr. Robert Carlson reviewed the agenda for the workshop, introduced the speakers and described the afternoon field trip to the placer mining operation.

The first speaker was Dr. Ronald Johnson, Professor of Environmental Engineering, who gave a presentation on methods of mining waste treatment.

Major points:

* The procedures that were to be discussed only removed suspended solids. Dissolved solids that may be a problem also may be present. The most common and practical technique of removing settlable solids is the settling pond or basin which provides a large volume for gravity separation.

- The size of the particles is very important in the design of settling ponds. The settling rate is proportional to the square of the diameter of the particles. Particles with a diameter less than 10 microns are not effectively removed by settling ponds.
- * Performance is usually less than ideal. Problems with settling ponds include thermal currents, turbulance from wind and short circuiting of the pond.
- * Effluent can be cleaned if money is no object, but a mine operator is limited by economics in what he can do. It may not be economic to built a properly designed system. Also coagulants can be added to speed up settling but these chemicals cost money.
- * Another method of separating solids from water is the cyclone which is a centrifugal force separater cycle. It however needs power to operate and of course that power is not free. Lemell settlers, which are bundles of tubes or trays that enhance the gravity method of settling ponds, can be used but having high capital cost.
- * Of ten mining operations visited by EPA in 1977, five were meeting settlable solids standards; two, the turbidity standards. The reason the standards were not met were short circuiting of ponds and fine suspended solids.
- * A good settling pond design will distribute the flow uniformly throughout the pond so that all particles have equal time to settle. Effluent should only be coming from the surface. A series of settling ponds work better than one large pond. The slope of the pond bottom should be as flat as possible.

Next was Ernest Wolff, Associate Director, Mineral Industries Research Laboratory, giving a slide show on an overview of placer mining in Alaska.

Major points:

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- * Mining has been considered a very unimportant industry in Alaska in the past few years but a look at the map shows how important mining was to the settlement and development of Alaska. With a rise in the price of gold, mining activity is increasing again.
- Placer deposits form over time by the high density gold settling in the streambed down to bedrock. In low cut placer mining the miners cut through the overburden and gravels to get to the bedrock. Water is important in carrying off the undesired material. With the rise in fuel prices, water is becoming more important. Heavy equipment is not as economical as it was and hydraulicking -the use of water under a pressure head -- is being reintroduced.

* Two principal methods of sluicing exist:

1. The Ross box which is set in bedrock, and

2. The elevated sluice box set on stilts.

The former has easy access but the problem with the removal of tailings, the latter is reversed with the difficulty of getting material in but the tailings can be left to pile up.

* Other inovations in placer mining are the drag line introduced in the thirties and the use of heavy equipment, notably caterpillars. Front-end loaders have started appearing in the past six years to replace drag lines.

Next on the agenda was Dr. Daniel Hawkins with a presentation on the geochemical aspects of placer mining.

Major points:

- * The major environmental effect of placer mining on water is the entrained sediments and if that can be controlled most of the problems with placer mining will be alleviated.
- * The two major geochemical effects of placer mining are
 - 1. In the interior where water must be recycled because lack of supply, the possibility exists of a buildup of harmful levels of dissolved constituents; and
 - 2. In the primary gold deposits, when these desposits weather, the arsenic associate with gold dissolves and becomes much more mobile. The sediments of the streams near these deposits become arsenic enriched. The possibility exists for a sequence, perhaps through biochemical means, where these heavy metals are leached into the water.
- Q LeVake Renshaw: Have you given any consideration to the effects of cyanide leaching?
- A Danial Hawkins: Cyanidation is becoming more common and more thought should be given to how to dispose of the waste materials and effluent. Cyanide occurs naturally and does not have a long lifetime especially in the soil environment, so probably the problem can be successfully attacked by chemical engineering techniques.
- C LeVake Renshaw: This was brought up because in Southcentral Alaska there is a possibility that several cyanidation plants will be coming on line. It is not something to be afraid of but there needs to be an awareness of the potential problem.

The next speaker was Dr. Ed Brown who gave a presentation on micro-biotechnology involving biological metal extraction, a form of hydrometallurgy. It could more simply be called microbial mining.

Major points:

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- * Hydrometallurgy is a metal extraction process using aqueous solutions to dissolve metal from rock. It is becoming more popular because the major method of metal extraction, smelting, is becoming less attractive due to the increasing price of fuel. Also, hydrometallurgy entails less air and water pollution, is easier and less expensive in remote areas and can be done economically in small units.
 - The hydrometallurgical process (which works on an oxidationreduction principle) was explained in some detail. Biohydrometallurgy is valuable because organisms exist that live by oxidizing the oxidizing agent used in hydrometallurgy, ferrous to ferric iron in the example described, thus enabling the establishment of a continuous cycle in the hydrometallurgical process.
- * The organism being studied by the Institute of Water Resources is <u>Thiobacillus</u> ferrooxidans. This organism thrives in a very acid environment, derives its energy by oxidizing ferrous iron to ferric and is temperature tolerant. It can act directly on a metal by oxidizing the sulfide -- copper sulfide is an example.
- * The leaching process can come in several forms: heap, vat and <u>in situ</u>. <u>In situ</u> is becoming more popular because of environmental requirements.
- * The activity of these organisms may be creating problems naturally in interior Alaska by accelerating the movement of arsenic from exposed tailing piles into ground water.
- * Other possible uses of microbial mining include gold lode deposits associated with sulfite, uranium, molybdenum, zinc, copper, autimony and the washing of high sulfur coal. The latter is creating interest given the present concern over acid rain in the East and Mideast from sulfur dioxide emissions from burning coal.

Next on the agenda was Dr. Robert Carlson. He gave a presentation on hydrology and stream characteristics associated with placer mining.

Major points:

- * In placer mining one must move a lot of material to get a little gold and just about every stage involves some water. To study the hydrology of placer mining stream one must consider three elements: precipitation, terrain, and channel characteristics.
- Precipitation in interior Alaska, which is one of the most important placer mining areas, is relatively low -- 10-15 inches per year. About half occurs as snow which accumulates from October to May and is gone by May 1. Rainfall occurs mainly in short storms with an occassional long, intensive storm.

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In terms of terrain, many placer operations are in the headwaters where there is not much drainage area and thus not much build up of water. The second area is the hill slopes which typically have a thick mat to absorb snow melt runoff and have a more dependable water supply. The third area is the valley bottom which may have a marshy mat varying from a few to a hundred feet above the gold bearing alluvium.

Permafrost is a dominating feature in the interior. It can act as a dam to ground water and prevent access of the ground water to the surface. Summer flow is maintained by snow melt. Not much of the summer rainfall runs off into streams unless there is an intensive or long storm. Typically, stream discharge will be highest in spring at break up, decrease throughout the summer with a few storm peaks and be low during the winter.

- * A channel must accomodate itself to a flow, carries a certain amount of sediment, flows on a slope and must accomodate itself to the bed and bank material.
- * What this means to placer mining is that the miner will have a consistent summer supply that is determined largely by the previous winter snow pack but augmented by summer storms. The interior is well vegetated so little sedimentation occurs naturally. Three things may happen to a channel from mining:
 - 1. The slope may increase because of sediment introduced into it,
 - 2. The stream may go out of its banks because the bed becomes elevated from the deposition of sediment, and
 - 3. Channel width may increase.

The next speaker was Jacqueline LaPerriere, Assistant Professor, Institute of Water Resources, who gave a presentation on the effects of sediment on aquatic life.

Major points:

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- * It has been found that sediment damages aquatic life, however, the current water-quality standards for sediment cannot be tied to any level of damages. Research is needed to develop standards that are enforcable, i.e., standards that can tie damages to certain measurements.
- * The most obvious affect of sedimentation on fish is that the fish will move out of the areas that have high sediment loads. Also spawning areas are covered up, the food chain is disrupted and sediment may physically harm fish, in particular the gills.
- Q LeVake Renshaw: Do fish move out or can you just no longer see them because the stream isn't clear?

- Jackie LaPerriere: That's a question that needs more research, however, in whole areas of the lower 48, grayling have become extinct and that has been largely attributed to the effects of sedimentation and water temperature increases.
- LeVake Renshaw: This controversy has been the cause of a polarization between the mining industry and environmentalists. Both sides hang on to extremes while the truth may be some shade of gray. This subject needs much research which should be supported by the Board.
- Jackie LaPerriere: This problem is complex and difficult. Adequate research is needed but would require many years and much money.

With the conclusion of Ms. LaPerriere's presentation the workshop was over. Chairman Sims thanked the participants and adjourned the meeting for lunch.

After lunch the Board members and other attendees of the meeting went on a field trip led by Ernest Wolf to the placer mining operation of Walter Roman. This operation was on Fish Creek near Cleary Summit. The principal feature of Mr. Roman's operation was that he was hydraulicking -- withdrawing water up on the hillside, sending it through a gradually reduced pipe and using the force of water so generated to move unwanted material, rather than using heavy equipment such as caterpillars. He estimated that he had 100 feet of head. At the time of the visit he was not sluicing but was using the water to strip the overburden. His sluice box was the elevated type. Downstream of the area of present mining was an abandoned gold dredge. There were no tailings ponds operating but his men were in the process of constructing one.

The meeting was called back to order on Thursday at 8:45 a.m. Linda Dwight of the Institute of Water Resources was the first speaker and gave a presentation on the Five-Year Water Resources Research Plan.

Major points:

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- * The final draft of the plan was discussed. An earlier draft of the five-year plan had been presented at the March meeting of the Water Board. The process of developing the plan had been started at the Alaska Science Conference. Over 90 organizations were contacted and approximately 800 agencies received the announcement via the Institute of Water Resources newsletter. Many comments were received.
- * From the comments, the seven major topics for which research in Alaska will be beneficial are: hydraulic-hydrologic processees, geochemistry of Alaskan waters, aquatic and terrestrial ecology, aquatic ecosystem impact in management strategies, pollution control technology, alternative energy technology and information dissemination and training.

- A computer printout that lists the active research projects in 1979 was given to Chairman Sims. The numbers listed are to be used as a guide because the projects are not always of a comparable scale.
- Q Dick Sims: What were the criteria used to classify projects as research? Some of the entries don't seem to be research projects.
- A Linda Dwight: Basically the goal is to encourage people to list as much as possible. Some of the entries are not really research plus some mistakes exist. The list had not been proofed before giving it to the Board.
- * The Institute of Water Resources has projects studying hydrologic behavior of seasonally frozen soils, development of adequate water supplies, the usefulness of fracture face and linament mapping for ground-water mapping, construction and design of engineering structures that will not impede fish passage, geomicrobiology of arsenopyrites in interior Alaska, phosphate limitation of growth of algae, effects of oil spills in northern fresh water, studies on the productivity of Clearwater Creek, waste-water treatment in the seafood processing industry, transfer of oxygen in gravel salmon spawning beds and a builder's guide to water and energy.

Dr. Robert Carlson followed this presentation with a discussion of the role of the University research with the activities of the state agencies.

Major points:

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- * The Institute of Water Resources is centered at the Fairbanks campus and most of its activities are in interior Alaska. They are trying to include activities operating out of Juneau and Anchorage campuses.
- * The Institute of Water Resources consists of about ten principal investigators, ten graduate students and five to ten technical, clerical and financial people. Research is characterized by a project that has a professor or principal investigator and a graduate student-technician assigned to it. It runs from six months to three years and usually reports have to be issued. Publications are encouraged. Sometimes the final project is very worthwhile, sometimes it is not very useful, and occassionally the project is a disaster.
- * The Institute of Water Resources tries to focus as much as possible on problems of interest to the State of Alaska. To get problems identified the Institute talks to different organizations like the Water Resources Board. Once a problem has been identified one of the principal investigators and graduate students have to be interested in doing work on it. Finally, any project that is developed needs to be funded.

One of the valuable functions of the Institute of Water Resources is training graduate students who then work in the state. This is also good for the Institute in terms of information dissemination.

- Research frustrations include being encouraged to develop a research proposal by an agency and then being turned down for funding by that agency, and being funded by an agency to start a project and then having the funding cut off in the middle of the project because of the lack of interest by that agency or a changing of priorities. Also, outside Universities sometimes compete with the Institute and, because they don't understand the difficulties of doing research in Alaska, underbid the Institute. The final product is often not acceptable because the research was underfunded.
- Q Wayne Westberg: Does the Institute of Water Resource have access to the results of research in Alaska done by outside Universities?
- A Bob Carlson: If the research activity or researcher is known, getting the results is not usually difficult; otherwise it is. Federal funding agencies only know what their specific section is doing.
- Q Wayne Westberg: What is the relationship of the Institute of Water Resources with the private sector?
- A Bob Carlson: The Institute of Water Resources tries to stay with projects that the private sector doesn't want or can't do. These types of projects usually require long time period, involve an element of risk or require specialized expertise or equipment. The Institute has a duty to train people to work in the private sector.
- Q Peg Tileston: How can the Board be of assistance to the Institute of Water Resources?
- A Bob Carlson: The most helpful role would be to criticize the work of the Institute. It's valuable to the Institute to have the citizen's view of the Institute's work.
- C Bob Carlson: Alaska is undergoing an economic revolution. Alaska is pulling away from the federal government and at the same time the federal government is not funding projects in Alaska as readily as in the past under the assumption that the state has more money to fund projects itself. State government needs to take a long term look at data and research needs. The state must take on more responsibility and not wait for the federal government to do research or collect information.

Next on the agenda were Brent Petrie of the Department of Natural Resources and Doug Lowery of DEC giving a review of the activities of the placer mining task force.

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Major points:

- * \$160,000 was appropriated to fund field activities this summer. A consulting engineer has been hired to fill the newly created mining engineer spot at DMEM.
- * Activity with the three agency permit was at a stand still but a recent meeting in Fairbanks cleared up problems. The three agencies are going to be doing field inspections together.
- C LeVake Renshaw: The experience of one applicant with the three agency process was that after two weeks he had been granted a permit by Fish and Game, after four weeks DEC notified him that they had received his permit and that he might need an EPA permit and after two months he hadn't heard a word from DNR. He went mining anyway but now may be inspected without receiving any guidance from DNR.
- C Dick Sims: The Board had made recommendations that something of the nature of this tri-agency permit and the working group be created in anticipation of an increase in placer mining this summer. Hopefully, the one permit system is making it easier to mine legally.

Next, Bill Lamoreaux discussed EPA's relationship to the placer mining activities of the task force.

Major points:

- * Because of overlapping authorities with waste water discharge permits, EPA is coordinating activities with those of DEC on the placer mining task force.
- * In the past EPA's reaction to a violation of the water quality standards have been to initiate some form of enforcement action. That is changing now to where EPA is now working with the miners to see how standards can be complied with -- that's a major change in philosophy.
- * There is a large backlog of permits. EPA is looking for ways to decrease the backlog and the most promising or likely way is the issuance of general permits. Permit applicants are told to follow guidelines set down in other permits until the EPA permit is issued. EPA cannot expect miners to not mine for two years while they are waiting for EPA's permit.
- Q LeVake Renshaw: Does the possibility exist that a mining district could apply for an EPA permit for all the miners in that district?
- A Bill Lamoreaux: That's definitely a possibility with a general permit.
- C Dick Sims: The importance of all this to the Board is that a person can get a prompt answer even if it's a no. There seems to be some progress in this direction.

C LeVake Renshaw: Progress is being made. The very least a person deserves upon filing an application is some kind of acknowledgement so if there is a delay in processing he can still go ahead with his activity.

Next was Dan Hawkins of the Institute of Water Resources, who returned to talk more specifically on arsenic and nitrates in the Fairbanks area.

Major points:

- * The Institute of Water Resources is not involved in nitrate studies but it is involved in a study of arsenic in water, rock and soil in Ester Dome area. Ester Dome is know for high arsenic in the ground water, is a prime residential area and is also seeing a renewal of mining activity.
- * Study results are that an extreme concentration of arsenic in bedrock exists in the eastern flank of Ester Dome. This arsenic is associated with gold mineralization.
- * High arsenic concentration is often a result of poor oxygenation of ground water. Arsenic is often associated with high iron. If that water is properly oxygenated the arsenic will precipitate with the iron. The high arsenic concentration rarely occurs in surface water. The problem is dissolved arsenic in ground water.
- * There may be some uptake of arsenic in vegetation. Setting aside environmental concerns, this may be a valuable gold prospecting tool. Environmentally, the problem may be more serious from an uptake of arsenic from soils enriched by years of watering rather than the watering itself.
- * Through the cooperation of local well drillers, cuttings from new wells have been analyzed. As expected, a strong correlation exists between arsenic in the water and arsenic in the rocks themselves.
- * If the arsenic is associated with iron in the ground water, a simple cascading system to oxygenate the water would be an effective way to remove both from the water. There are other methods such as reverse osmosis, ion exchange and activited aluminum columns, but cascading systems are the most natural, simplest, least expensive and, if done properly, are sufficient treatment.
- * Other activities concerning arsenic include a study by the Center for Disease Control looking for the effect of drinking arsenic enriched water in the Fairbanks area and the work of Ed Brown and Dick Stolzberg looking at the role of microorganisms in the release of arsenic from sulfites.
- * With lode mining starting again in Ester Dome area, a recurrance or worsening of the arsenic problem can be anticipated because of the waste piles of arsenic enriched material.

Brent Petrie and Ernst Mueller: DEC is doing a study on the relationship of water supplies to the availability of financing. Apparently, money doesn't get lent for housing relying on hauled water even if that's the best source of water for these homes. This is enough of a problem that individuals have drilled a well even though they knew they would not rely on that well for their water supply. The banks are starting to become more flexible on this.

After a break Chairman Sims called the meeting back to order and gave his presentation on the reorganization of water resources programs within the state.

Major points:

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- * The reorganization will create a new department that could be called the Department of Water and Environmental Conservation. The water-related activities would be taken out of DNR and put into the new department which is basically the existing structure of DEC. The decentralized structure of DEC would allow for better service to the public. The organizational chart shown on the following page was explained.
- * This organizational structure would give line authority for program managers like Brent Petrie in the districts, allow people to go to one place to get their water permits and take water programs away from the more political land programs.
- Q Fred Boness: Has this been discussed with the agency people?
- A Dick Sims: With some -- there might be moderate resistance at the division director level.
- C There followed a general discussion of the reorganization scheme. It was brought out that many of the problems in DNR would be resolved by better management or more manpower. Also, part of the water management section's problem is that it is losing an internal battle within DNR -- who is to say that that would not happen in the new organization also.
- C Dick Sims: The purpose of this presentation was to get the Board thinking about this. Water management will never be a high priority in DNR and for it to be effectively managed it must be moved out. It would be good if the Board would bounce this around, perhaps talk with agency people and discuss this again at a future meeting.

Next Brent Petrie gave the DNR agency report.

Major points:

* In the past year DNR reorganized from six to nine divisions operating along functional lines.

Department of Water and Conservation



- The budget has been organized on a topical basis. Water Inventory went from \$150,000 to \$385,000; Water Management, \$540,000 to over \$900,000. The goal is to process 2100 water rights. Other projects that were funded include Federal Reserved Rights, the Water Resources Board, Water Management Plans, and Water Users Handbook. Projects or programs not funded were membership in the Western States Water Council and the Dam Safety Program.
- * The geothermal bill passed in the form discussed at the March meeting. The instream flow bill passed also, but was modified a bit. DF&G was given two years to update the anadromous fish stream catalog, every 10 years the instream flow reservation must be reexamined and a 180 day limit was given to process a water right after notice has been published in a newspaper.
- C Dick Sims: The lack of a dam safety program is a problem. The state is inventorying dams, finding some unsafe but has no follow-up program.
- Q Fred Boness: How does the Water Management Section increase compare with other parts of DNR?
- A Brent Petrie: Within DNR, water received a significant increase when compared to others. DGGS also did well.

Chairman Sims reconvened the Board as the 208 Policy Advisory Committee. The minutes were approved with one correction (p. 12, 5 lines from the bottom, change \$103,000,000 to \$1,300,000).

Jerry Brossia, of DEC's Fairbanks office, described the placer mining settling pond demonstration project DEC will conduct in 1980 and 1981 and showed slides of mining operations.

Major points:

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- * The purpose of the project is to find out what effluent quality can be achieved by a miner, without using special equipment, when the pond is carefully designed and built.
- * The project will be done on the mining site of a volunteer miner, on Porcupine Creek in the Birch Creek drainage. The miner and his equipment will be hired to construct a settling pond according to a consultant's specifications. Clear water comes into the site and there's enough room to build a pond with a surface area of 16 acres which would contain about 26,000,000 gallons of water. Only conventional materials, such as tailings and natural soils, found on the site will be used.

Steps of the project: (1) the consultant will go out to the mine site and take representative samples; (2) the consultant will design the pond; (3) the miner will have first right of refusal on the construction work; (4) monitoring will be conducted and adjustments will be made to the pond. Pond construction will be completed by September 1980, and monitoring will be done June -August, 1981.

- When the effluent quality is known, the Water Resources Institute can examine the impacts on the biota, fish, etc. The State Water Quality Standards may need to be reevaluated. A brochure will be developed at the end of the project to tell a miner how to build a pond, what things to consider, what the state requirements are.
- The cost of the project will depend on the particle size of the material and how long a detention time is needed. Construction costs should be between \$10,000 and \$35,000. \$115,000 is available for the total project.
- * EPA regulations cover effluent quality; DEC regs cover receiving water quality beyond a specified mixing zone. The standard which most miners have complained about is the turbidity standard.
- * Some miners have been willing to put in settling ponds but they don't look like the "textbook" kind. Miners use what they have available and, if it washes out, don't want to waste time during their short mining season to rebuild it.
- * Enforcement of state regulations is done on a discretionary basis due to shortage of personnel - if a mine isn't causing a problem, state people usually don't examine it. Some operations may not need settling ponds because their effluent doesn't affect anyone.
- * DNR's dam safety regulations may have to be followed by a miner building a settling pond.

Kate Graham of DEC next talked about the placer mining interagency working group and public information.

Major points:

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- * The working group will sponsor a symposium the day before the Alaska Miners Association convention in October. They're sending out a questionnaire to miners to find out primary concerns so they can be discussed at the symposium.
- * Public information activities have included a handbook that was distributed at the miners conference in April and some ads being run in Anchorage and Fairbanks area newspapers.
- Q Dick Sims: Do you feel that we're doing a good service to the miner by only addressing the three state agencies here and not EPA?
- A Kate Graham: It was a snap decision of mine. Other publications of ours should do a better job of explaining.
- Q Peg Tileston: Are you trying to evaluate the effectiveness of the ads and efforts like this?

A Kate Graham: We haven't figured out a way to do that yet.

* There will be TV public service announcements filmed soon.

- C LeVake Renshaw: If you want to reach the miners when they're active during the summer, most radio stations have a personal message service and many of them rely heavily on that.
- * There will also be a technical handbook written by Jerry Brossia that will be printed.
- * Some agency people are concerned that a few miners are reading the new tri-agency policy statement as saying that there will be no enforcement this year, that they can ignore a Notice of Violation or call their legislator to "take care of it."
- * The Anchorage area task force has been having trouble coordinating with the ADF&G representative.

After Kate Graham's presentation the Board adjourned for dinner.

At 7:45 p.m. Chairman Sims called the public comment session to order. First to speak was Ed Brown, Institute of Water Resources, who talked in more depth on bacterial leaching of arsenic.

Major points:

- * A present research interest is the increase in movement of arsenic into ground water due to the action of bacteria on exposed tailing piles. The process occurs naturally, but exposing the materials to the atmosphere may greatly increase the rate. One solution would be to cover the tailing piles.
- * Samples of water with <u>Thiobacillus ferrooxidans</u> and cultures of <u>Thiobacillus ferrooxidans</u> were shown to the Board members. The procedures for isolating these cultures were described.
- Q Dick Sims: If the tailings were covered, would the problem cease immediately?
- A Ed Brown: That would require more study. It would be necessary to know where the water is coming from. The age of the ground water in this area is not known yet.
- * The Institute of Water Resources is working on a new identification technique because the present one takes approximately three weeks. The experimental technique uses antibodies with a fluorescent dye. If successful, identification would be possible within several hours.
- Q Wayne Westberg: How fast does leaching with microbial mining work?

Ed Brown: Relying solely on natural rates as in heap leaching, it would take years but by controlling the reaction in vats the time needed would be weeks or months.

Next was Olin Patie, a local well drilling contractor, who related some of his experiences drilling and servicing wells in the Fairbanks area.

Major Points:

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- * A pollution problem exists in many parts of the Fairbanks area, especially the Six Mile area and along Badger Road and Chena Hot Springs Road with wells that are too shallow and/or too close to septic systems. On servicing calls, often the problem with the pump is that it is clogged with raw sewage.
- * A problem exists with substandard wells -- too shallow and poor materials -- being constructed by some local drillers. Also, it is difficult to convince homeowners that they need a deep well for potable water when water can be drawn from shallow depths. The homeowners often think the contractor wants a deep well solely to make more money.
- C There was a general discussion on how this situation could be ameliorated. DEL will look at a septic system or water well if it is notified. There are no enforced well drillings standards. If the bank finds out there is a problem, financing may be refused.
- C LeVake Renshaw: This is as much a health problem as the arsenic situation. The problem needs to be documented.
- C Fred Boness: Education should help. Homeowners will be skeptical of contractors telling them they need deep wells but if DEC starts publicizing the problems, more credibility will be attached to the contractors.
- C Wayne Westberg: With many people education will not be enough and neither agency appears to have the necessary regulations or standards to require adequate well construction. One possibility would be well construction standards that included a 40 to 50 foot minimum depth or penetration of an impermeable layer.
- C Dick Sims: DEC should advertise that tests are available at no cost and should recommend that people in questionable areas have their water tested.

Next, Bob Martin of DEC gave the DEC agency report.

Major points:

* DEC got the entire budget requested except a few new positions which now won't be needed anyway.

- A comprehensive oil pollution control bill was passed that included extra spill response capability in DEC regional offices, required contingency plans for storage and transfer facilities, and provided a \$1,000,000 revolving spill clean-up fund.
- * A litter control bill was passed that will add four staff to DEC including an information officer.

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- C Peg Tileston: Only \$500,000 was appropriated for this -- much less than expected. The bill includes grants for community use in establishing recycling operations, but since the funding isn't there, it's a paper title.
- * DEC's water and sewer construction grants program was expanded to include solid waste facilities. The grants will be 60% instead of 50% if projects involve resource recovery. But the bond proposition was not increased to include the solid waste facilities, so money originally planned for water and sewer projects will have to be stretched.
- * Another bill will provide financial aid to communities that have high energy costs and, due to these high costs, have trouble running water or sewer systems.
- * DEC reorganization has basically gone quite well. The agency is considerably streamlined -- fewer people in charge so people know where to go for answers. There is still a communications problem between the regions and the central office but upper management is dedicated to squaring it away.
- C Peg Tileston: It's an attitudinal situation. It's important to realize it's an on-going problem.
- * Sanitarian, veterinarian and meat inspector positions were transferred to DEC from DNR and DH&SS. Most of these are in the regional offices and inspections will be integrated into the existing programs.
- * DEC is trying to define a monitoring strategy. It's still an open question and the Board could influence its direction. We owe it to the citizens of the state to be able to say what is happening to water quality over a long period of time and we don't have an adequate base of information for that.
- C LeVake Renshaw: You have a beginning of a base with all the monitoring work done for the pipeline.
- C Fred Boness: A lot of it is under the jurisdiction of the Pipeline Coordinator's Office, but Alyeska claimed confidentially. It's potentially in the State's custody, but nobody that can use it or see it.
- * A major undertaking is the State-EPA agreement which will be the major coordinating document between DEC and EPA outlining what areas of responsibility belong to which agency.

- * There is a problem with EPA about meshing the best management practices with the forest practices regulations. BMP's will be voluntary for the first year and then the program will be reexamined.
- * The problem in Ketchikan with subdivision sewer systems is essentially resolved between DEC, DNR and the Borough.
- * The permit coordination center for Fairbanks was approved in DEC's budget.
- C Dick Sims: The permit information books ought to be better distributed.

After Bob Martin's presentation the meeting was adjourned for the evening.

Chairman Sims reconvened the meeting at 9:00 a.m., Friday morning. The first speaker was Jim Clare of DEC reporting on the status of the on-lot waste disposal study and the sludge disposal study.

Major points:

- * The 208 program is dealing with these subjects because the present regulatory programs are unable to deal effectively with the large number of problems caused by waste disposal methods.
- * DEC will work closely with the Municipality of Anchorage on their 208 Hillside study to avoid duplication. The Hillside study is primarily a problem with lack of policy regarding development while DEC is dealing with more general problems relating to geographic conditions.
- * Many borough and municipal governments in the state have problems with waste disposal because of lack of authority (for 2nd class governments).
- C Wayne Westberg: The 100 foot separation distance required between wells and septic tanks should be flexible. Anchorage, in operating its own program with standards that are equal to or more stringent than the State's, is sometimes too inflexible about the separation distance.
- * Board members discussed the feasibility of coordinating an installers trade show with the homebuilders association.
- * Five consulting firms responded to the RFP. Their proposals were reviewed by DEC central office and regional office staff based on four major criteria. Quadra Engineering was scored highest with Arctic Environmental Engineers second. Most responses were from medium-sized or small firms.
- * The technical advisory group, which will not have approval or veto power, will review the consultant's intermediate outputs, along with the Board, to keep the study practical and effective.

- The sludge study has been postponed for a few months to be certain it can be coordinated with information needed for the solid waste management plan.
- * Emphasis in the contract will be placed on the need for practical application of the final products.

Next Richard Seifert of the University of Alaska spoke on his activities on alternative energy.

Major Points:

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- * Alternative energy has for a long time been looked down upon. Recently with the energy crisis, large amounts of money has been available for research into alternative energy and it has become more respectable.
- * Ground-water heat pumps are one form of alternative energy that the Board has expressed interest in. They operate like a freezer in reverse. One of the critical problems with ground-water heat pumps is that the temperature of the ground water to be used must be above a certain level. There must be a reasonable differential between freezing and the natural ground-water temperature. In practice, it has been found the temperature usually has to be above 40 degrees Fahrenheit.
- * One needs to realize that effluent can't go into the same well from which the water was withdrawn. Two wells are necessary.
- * Ground-water temperatures in Alaska are not well known. Cataloging temperature near population centers, and also cataloging temperature anomalies would be good research projects.
- * To help develop alternative energy in Alaska the Alaska energy center was established by the Legislature this year. It was appropriated nearly one million dollars for research and application of alternative technologies. The center will be located in Fairbanks.
- Q Wayne Westberg: What could be done to get some action initiated on ground-water heat pumps?
- A Richard Seifert: This is an Alaskan specific technology that the energy center should look into. Drilling should not be necessary -there is much existing information plus existing wells where temperature can be measured.
- C Wayne Westberg: Water temperature could be added as a parameter required with well logs.

Next, Bob Martin of DEC discussed the procedures and suggested topics for the next round of 208 funding.

Major points:

- * EPA will identify nationwide and regional funding priorities; DEC contributes a list of Alaskan interests that will be combined and prioritized with those of other Region X states. The grant money will be divided among the states based on these priorities. Examples of national priorities are agriculture and ground-water projects.
- * Also being considered is a village environmental plan demonstration project. A positive result of the project might be legislative funding of a grant process for communities to pursue their own environmental planning. Since EPA is most interested in projects which produce tangible results this potential outcome might help assure their funding of this project.
- C LeVake Renshaw: I think heavy metal considerations and water sources should be looked at carefully.
- * General discussion by the Board: Main priority identified in EPA's Category I: ground water. Priorities in Categories II and III: small systems, ground water, mining, hydrologic modification, recreation.

Bob Martin also described the revisions being made to the wastewater disposal regulations.

Major points:

- * Many areas of the state are unable to dispose of septic tank wastes at local sewage treatment plants; cities are unwilling to provide services to those who don't pay city taxes; and many plants use a treatment process that is unable to handle the strain caused by septic tank pumpings. One of the possible solutions to that problem would increase the demand on the sludge handling equipment.
- * The regs will be reorganized to eliminate redundancies and to make them easier to understand.
- * Also to be considered are on-site inspections in conjunction with subdivision reviews and individual facility inspections. DEC is compiling a list of the varying requirements of lending institutions to see what we need to do to cooperate with them. Also in question is the current mandatory hook-up requirement. DEC is considering adding construction standards for on-site facilities into the regs. Another proposal is to add more specific direction about how to handle sewage disposal in a subdivision on a site-specific basis.

After lunch Ron Crenshaw, representing the Division of Parks, spoke on the maintenance of access to sport fishery sites on lakes and rivers. A slide show was used to give a demonstration on the trash problems at these sites. Fran VanValenberg, representing DF&G, came later.

Major Points:

- * Responsibility to resolve the problems is shared by DEC, DF&G and DOT&PF along with the Department of Natural Resources, specifically the Division of Parks. The problem is the combination of an extreme amount of pressure by the public to use the land and a lack of management of the resource. The access sites are being created by public interest land identification from HB 66 and by Fish and Game reviewing state subdivisions.
- * No agency has a mandate to provide management of these sites. The Division of Parks is only supposed to maintain designated state parks. It would be helpful if the Water Board passed a resolution requesting that the funds be made available to study the situation and recommend a management strategy.
- Q LeVake Renshaw: Have agencies ever sat down to discuss this problem?
- A Ron Crenshaw: Informally this has happened. The Division of Parks has been talking with the Department of Fish and Game the past eight months and arrangements have been made with DOT&PF for maintenance of their waysides.
- Q Wayne Westberg: If three million dollars were located would some agency step forward to pickup the trash?
- A Ron Crenshaw: It would be difficult because of over-lapping or unused authority. The Division of Forest, Land and Water Management has management authority in some of these areas but has shown no interest in maintaining access sites. The Department of Fish and Game with its fish stocking program has been the magnet but has no responsibility or authority for maintenance.
- C Fred Boness: Closing down access sites would be unpopular but it would get enough people clammering to have trash picked up so that the sites could be opened again. The Legislature might appropriate the money then. Division of Parks should get the job and the money because they have had the most experience with the problem.
- C LeVake Renshaw: What is needed is a letter or resolution requesting that a lead agency be designated. Not much planning is involved -someone needs to be told to do it and then they must be appropriated the money to get it done.
- C Wayne Westberg: This presentation is focusing on one aspect of the problem. At some point a decision must be made on what level of management is required for these lands.
- C Fred Boness: Nobody has really tried to solve this problem other than to try to push it off on some other agency. It doesn't appear that any agency has asked for money. Perhaps when the public calls complaining about trash they should be directed to

talk to their legislator. The slide show that the Board was given also might impress the Legislature.

Jim Clare of DEC returned to describe the staff recommendation regarding DEC's potential assumption of the NPDES permit from EPA.

Major points:

* The pulp mill industry in Southeast Alaska, feeling the EPA was insensitive to unique Alaskan conditions, requested that the State begin to administer the discharge permit program. A contractor was hired to review the present structure of the program.

* Based on the consultant's report the DEC staff recommendation to the Commissioner is to not assume the program until, possibly, a later date. No additional federal funds would be available; EPA would not be able to delegate many important decisions; the NPDES program is unstable right now and expanding into other programs; the present monitoring program would have to be significantly expanded. DEC feels its present water pollution program should be strengthened before assuming the NPDES authority.

LeVake Renshaw moved that the Water Resources Board endorse the opinion of DEC in regards to the assumption of the NPDES program.

The motion was seconded and passed unanimously.

This was the end of the regular agenda. After listing the items that needed to be considered by the Board in its business session, Chairman Sims asked Chris Johnson, House Research Agency, if she wished to give a presentation on her project on water allocation. Major points:

- * The House and Research Agency is the House of Representative's permanent research staff. One of the projects that the House has designated to be studied while the Legislature is not in session is water allocation. The report that the research agency produces will probably be a series of issue papers on perhaps five key problem areas. Issue papers would give background information and develop legislative options.
- * The purpose of the trip to the Water Board Meeting is for reconnaissance purposes to find out what the Board feels are critical areas in water allocation.

The Board next went into its business session.

Water Resources Programs Reorganization

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C Dick Sims: The Department of Environmental Conservation should be thanked for the enthusiasm exhibited at this meeting -- it is similar to that shown by Brent and the Department of Natural Resources staff two years ago. The problem is the DNR reorganization -- the central office is being further removed from field operations. Rather than endorse the reorganization, the Board should outline the problem in a letter to Geoff Haynes and ask for his comments.

- C Fred Boness: That approach is a good one but an acknowledgement should be made that with the budget increase for water, perhaps problems are being resolved within the Department. Also the Board sees the problem as one of lines of authority within the Department. Perhaps Geoff Haynes does not see it that way and sees ways of short circuiting those lines.
- C LeVake Renshaw: It should be noted that the Board feels with the increase in budget, there should be a corresponding elevation in authority for water management.
- * Fred Boness moved that the position suggested by Dick Sims with the discussed modifications be adopted. It was seconded and passed unanimously.

Placer Mining Task Force

- C LeVake Renshaw: One complaint has been the unilateral and perhaps overzealous approach taken by one individual from the Department of Fish and Game.
- C Brent Petrie: This person has good relations with the public. He just doesn't always work well with other agencies.
- C Peg Tileston: The tri-agency task force is not only an agreement for the agencies to work together on the upper levels but also on the field levels. However, is it necessary for all the agencies to go out together every time?
- C Fred Boness. One person should be able, at times, to go to a site, evaluate the situation taking in all three agencies' concerns and communicate this to the other agencies.
- C Brent Petrie: This program has just gotten started. Policy was set months ago but actual implementation has only started occuring in the past two weeks.
- C LeVake Renshaw: It's still too early. This should be looked into at the next meeting and if the problems have not been ironed out, the Board should take action.
- * Wayne Westberg moved that the Board write a letter to the agencies noting that they have heard of problems with the tri-agency permit and request that the matter be looked into. This motion was seconded and unanimously passed.

Geothermal Regulations

- C Fred Boness: The Board should receive copies of the geothermal regulations and the Board should adopt a resolution or send a letter advising agencies that the State ought not simply concentrate on high temperature geothermal but also on low temperature, including the ground water heat pump with perhaps a cataloging of the water temperatures throughout the State.
- C LeVake Renshaw: This is the type of research that should be coordinated between state agencies and the University of Alaska.
- It was agreed to send a letter on the cataloging of ground-water temperatures to the Division of Power and Energy Development and DNR. Also a letter would be sent to DNR requesting that ground water temperatures be included in the well log program.

Priorities for the House Research Agency.

It was suggested that summaries of meetings from the past two years be sent to the House Research Agency. Problems that the Board has been concerned with the passed two years include advertising for water rights, placer mining, impact on fisheries, Native claims, the backlog, industrial water use, and procedures for court adjudication of water rights.

Dam Safety

- C Brent Petrie: The Dam Inventory program is going full swing. The field teams will find dams that need attention but the dam safety program was not approved. New dams will be taken care of and it may be possible to go back to the Legislature for emergency funds.
- C Peg Tileston: Did the Legislature specify specifically state that the dam safety program was not important?
- A Brent Petrie: The problem was that new positions were in the safety program but not in the inventory one. The Legislature was much tougher on programs requiring new positions. If obvious problems exist, persons in danger would be notified. DNR just will not be able provide technical assistance or follow up on problem dams.
- C Fred Boness and Dick Sims: The State may be liable for damages if the inventory program finds an obviously unsafe dam, the State does nothing and then the dam breaks. Even if the State gets out of the liability problem, people may be injured or killed and that should be avoided if possible.
- C Brent Petrie: This can be checked out with the Attorney General's Office. Of course, anyone downstream from an unsafe dam will be notified. A more in-depth presentation on the inventory program will be given at the next meeting.

March 19, 1980 letter to Ted Smith.

Chairman Sims asked Brent Petrie to respond to questions raised in the March 19, 1980, letter to Ted Smith.

- C Brent Petrie: The rationale for not advertising is that DNR would be deluged with paper that it cannot process. DNR is going ahead with the Water Users Manual and in the last issue of "Alaska's Resources" was an article on the need for water rights.
- C LeVake Renshaw: That publication goes to people already informed on water rights. The March 19 letter should be rewritten with two changes: 1) it should be directed to the Deputy Commissioner and 2) it should refer to private meetings.
- C Brent Petrie: On the Ship Creek adjudication, the funds were approved for adjudication of federal reserved water rights and these will be used to proceed on an adjudication on Ship Creek. On the reluctance to participate in the master application -that involves the Division of Forest, Land and Water Management's reluctance to include in these permit proceedings any action that involves transfer of land title or permission to use land. That is perceived as being different from permission to perform some activity and the Division is reluctant to combine the two.
- * The Board agreed to have the letter rewritten and sent to Geoff Haynes.

Uses of State Concern:

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- C Dick Sims: On the Coastal Management Program, we still don't have a definition of the uses of state concern. From contacts with the public, there is still a problem with the Department of Fish and Game claiming that maintenance of an entire flow of a stream is a use of state concern.
- C Brent Petrie: One amendment to the instream flow bill was that the Department of Fish and Game has until July 31, 1982 to update the anadromous fish catalog. This will provide evidence as to whether a stream is anadromous and, therefore, a use of state concern.
- C LeVake Renshaw and Brent Petrie: Earlier in the program a complaint voice by the districts was that the State was running away with the program. In the case of the North Slope Borough that doesn't seem to be the case, although, the North Slope Borough and the Department of Natural Resources are at odds on some points.
- C Steve Mack: The Coastal Management Program has changed in the 1¹/₂ years since the presentation in Juneau. Perhaps someone should be invited to give an update.

It was agreed to have this on the agenda for the next meeting.

Trelease Report

After a short discussion the Board agreed to review progress toward implementing this at the annual Juneau meeting.

Joint meeting with the Yukon Water Board in Whitehorse.

- C Dick Sims: The Board has been invited to meet with the Yukon Board in September. If the meeting is in September several members of the Board cannot attend. If the meeting is October, everyone would be available, however, the Board could not take a field trip to visit a placer mining site. It is more important that all the Board members have an opportunity to see how the water agency operates than it is for some to visit the placer mining site. Because the meeting site is not in Alaska, a trip to Whitehorse could not be considered a Water Board meeting. Three choices exist: 1) don't go, 2) the field trip to Whitehorse with no meeting and 3) a field trip to Whitehorse with a meeting somewhere in Alaska in conjunction.
- C There was general discussion on the alternatives. It was agreed that if enough money existed in the budget the preferred alternative was to have a field trip to Whitehorse in October so that all Board members could attend and have a regular meeting in December. DEC, DNR, and DF&G would be invited to send two key staff to the Whitehorse meeting.

Also with this there was a discussion on the length of meetings. The Board members agreed that the end of the meetings when the Board conducted its business was the most important part and that Board members and staff should plan on staying until all business was conducted, even if that meant staying an extra day. Staff was requested not to schedule any presentations after 2:00 on the last day.

The next meeting was scheduled for December 3-5, 1980.

Energy Center

There was a general discussion on what the Board could do in support of the energy center. Since the energy center had not been established yet, it was agreed that it was premature to take any action.

Letter from Bruce Schirmers, Realtor from Kenai Peninsula.

- Q Dick Sims: Was that letter ever responded to in writing?
- A Steve Mack and Brent Petrie: No, but he was telephoned and Brent Petrie had a long discussion with him concerning lack of information on water rights.
- * It was agreed that a response should be sent to Mr. Schirmers inviting him or the Board of Realtors to discuss this at the December meeting.

Five-Year Plan for Water Resources Research

- C Dick Sims: The presentations at this meeting raised his estimate of the Institute of Water Resources. The Board should actively support many of the Institute of Water Resources' projects.
- C LeVake Renshaw: Priorities for research would be to look into the limits in which the fishery resource can exist with stream water quality degradation and research into the application of ground water heat pumps, in particular ground-water temperature.
- * After some discussion the Board agreed to write a letter in support of the five-year research plan and write a letter to the Renewable Resources Revolving Loan Fund requesting support for fishery projects by the University.

Chena River Lakes Project

Steve Mack reviewed the progress on the Chena River Lakes Flood Control Project since the last meeting. Just before the last meeting, a draft environmental impact statement on the completion levee and upstream protective groins had been distributed. The Division of Forest, Land and Water Management reviewed the draft environmental impact statement and sent in comments that, in brief, stated that flooding was not adequately addressed, the need for the recommended upstream groin protection plan was not demonstrated and the recommended completion levee was an improvement but still not without risk. The Northcentral District Office is presently reviewing the right-of-way application for the completion phase. They are waiting for the final environmental impact statement and for comments from other state agencies. They will probably hold a public hearing to get comments from the general public.

The Board agreed to take no action.

C LeVake Renshaw and Peg Tileston: Another Corps of Engineers project that the Board should have been notified of is the water flood project at Prudhoe Bay. It involves marine water and presently it is too late now for meaningful comment, but it is something that should have been brought before the Board.

Testing for biological water quality in Fairbanks.

After some discussion the Board agreed to write a letter DEC stating that the Board strongly feels testinf for biological and mineral water quality should be routinely done, that the public should be made aware of the results and that these tests be publicized as being available to the public.

Parks Resolution

C Brent Petrie: This is one of those situations that can be resolved by a number of agencies, but it is a low priority project for all, thus it never makes it through the budgetary process.

- C Peg Tileston: DEC might have funds through the 208 program to do a management study in the future.
- C Steve Mack and Brent Petrie: In the presentation it was stated that the Division of Forest, Land and Water Management is not interested. That is not entirely true. The Division is essentially the State Bureau of Land Management. After the disposal process is over the Division will be more involved in active land management.
- C LeVake Renshaw: One thing that was not made clear is whether the Division of Parks mandate limits it to park areas. Aren't they also responsible for recreation state-wide. They are the logical organization to resolve this problem.
- * The Board agreed to send a letter to the Governor stating the problem, requesting cleanup funds and nominating Parks to do the job but stating that the problem is more complex than just trash cleanup.

Western States Water Council

Dick Sims reviewed his trip to the American Water Resources Association meeting in Tennessee. Alaska made a presentation that got a good reaction but at times was too much like a travellog. Of interest was that on votes on national water issues the eastern and western states formed definite blocs and Alaska's interest sided with the west. Based on his experience in Tennessee, Dick Sims felt Alaska should have more contact with other western states and asked the Board to endorse membership in the Western States Water Council.

- C Brent Petrie: A Board member might consider attending the July 17-18 meeting of the Western States Water Council in Great Falls, Montana. Issues of interest to be discussed there are the task force reports on national water policy and Indian and federal reserved water rights.
- * After a short discussion the Board agreed to write a letter to the Governor strongly endorsing membership in the Western States Water Council.

After discussing meeting with Geoff Haynes, Deputy Commission of DNR, and congratulating Peg Tileston on her election to the Board of Directors of the Sierra Club, the Board meeting was adjourned at 6:45 p.m.